



104720 - R8 FRED

REL
2007b
108-025-08
FRONTIER REFINING - CHEYENNE REFINERY (H
CONSENT DECREE, TAB 2009, AFS 56-021-000
Folder #: 104720

N2



FRONTIER REFINING INC.
a Subsidiary of Frontier Refining & Marketing Inc.

RECEIVED

APR 12 2010

ECEJ-AT

April 7, 2010

P.O. BOX 1588
CHEYENNE, WYOMING 82003-1588
(307) 634-3551
FAX (Main Office) (307) 771-8794
FAX (Purchasing) (307) 771-8795

Administrator, Air Quality Division
Wyoming DEQ
122 West 25th Street
Herschler Building
Cheyenne, WY 82002

Assistant Regional Administrator
Division of Enforcement, Compliance &
Environmental Justice
US EPA, Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

**RE: Benzene Waste Operations NESHAP (BWON) Annual Report
NESHAPS Subpart FF - Title 40 CFR §61.357(c)
Frontier Refining Inc., Cheyenne Refinery
Cheyenne, Wyoming**

To Whom It May Concern:

The correspondence herein is intended to fulfill the annual reporting requirements promulgated under Title 40 CFR §61.357(c) for the Frontier Refining Inc., Cheyenne Refinery located in Cheyenne, Wyoming.

Attachment 1 to this transmittal contains the Frontier Cheyenne Total Annual Benzene Quantity (TAB) for 2009. The detailed report is at the refinery and will be available upon request. The report contains: detailed explanation of the TAB results, the 2009 sampling plan, analytical reports and sampling log sheets.

As shown in Table 1, the TAB for the Cheyenne Refinery estimated to be 14.49 Megagrams per year (Mg/yr).

It is the understanding of the Frontier Cheyenne Refinery that this information satisfies the annual reporting requirement of Title 40 CFR §61.357(c). If there are any questions or comments regarding this correspondence, please feel free to contact me at (307) 771-8733.

Sincerely,

Stu Fischbeck
for Kelli S. Wilber, P.E.
Environmental Engineer

BWON Annual Report
April 7, 2010

Attachment – BWON Annual Report

cc. **Gerald Faudel, Frontier Denver**
 Wayne Kadlec, Frontier Denver
 Joe Guida, Guida, Slavich, & Flores
 Stu Fischbeck, Frontier Cheyenne

I certify that the information contained in this report is true, accurate, and complete to the best of my knowledge based upon my reasonable inquiry of the person(s) responsible for preparing this report.



Kevin D. Burke
Vice President & Refinery Manager

**2009 TOTAL ANNUAL BENZENE REPORT
FRONTIER REFINING INCORPORATED
CHEYENNE REFINERY, CHEYENNE, WYOMING**

April 1, 2010

Project #: 003-050-009

SUBMITTED BY: Trihydro Corporation

1252 Commerce Drive, Laramie, WY 82070



ENGINEERING SOLUTIONS. ADVANCING BUSINESS.

Home Office | 1252 Commerce Drive | Laramie, WY 82070 | phone 307/745.7474 | fax 307/745.7729 | www.trihydro.com

Table of Contents

1.0	INTRODUCTION	1-1
1.1	Facility Information	1-1
1.2	Annual Process	1-1
1.3	Sampling Data.....	1-2
2.0	2009 TOTAL ANNUAL BENZENE REPORT.....	2-1
2.1	Introduction.....	2-1
2.2	Coker – Unit 36.....	2-1
2.3	Crude – Unit 25.....	2-1
2.4	Sour Water Stripper – Unit 26	2-1
2.5	Distillate Hydrotreater – Unit 32	2-2
2.6	Scanfining/Naphtha Hydrotreater – Unit 20	2-2
2.7	Fluid Catalytic Cracking – Unit 20.....	2-2
2.8	Hydrobon – Unit 27	2-2
2.9	Platformer – Unit 31	2-2
2.10	Amine Treater – Unit 24	2-2
2.11	Gas Concentration – Unit 28.....	2-3
2.12	Alkylation Merox – Unit 35.....	2-3
2.13	Butamer – Unit 37.....	2-3
2.14	New Amine – Unit 34.....	2-3
2.15	#3 Sulfur Recovery – Unit 23	2-3
2.16	Storage and Handling.....	2-3
2.17	Laboratory Waste.....	2-4
2.18	Spills and Miscellaneous.....	2-4
2.19	Solid Waste.....	2-4
2.20	Maintenance and Turnaround	2-4
3.0	SUMMARY.....	3-1



List of Tables

- 1.1 BWON Program Review Sample Results 2009**
- 1.2 Trihydro Database Sample Results**

List of Appendices

A. 2009 TOTAL ANNUAL BENZENE REPORT

1.0 INTRODUCTION

1.1 FACILITY INFORMATION

Frontier Refining Company (Frontier) operates a petroleum refinery in Cheyenne, Wyoming known as the Cheyenne Refinery (Cheyenne or Refinery). The Refinery processes approximately 52,000 barrels per day (BPD) of crude oil to produce gasoline, diesel fuel, asphalt, and other refined petroleum products.

In the past, the Refinery has reported a total annual benzene (TAB) quantity of less than 10 Megagrams (Mg). Therefore, the Refinery was not an affected National Emission Standard for Benzene Waste Operations (commonly referred to as BWON) facility. Frontier entered into a New Source Review Consent Decree (Consent Decree) with the Environmental Protection Agency (EPA) and Wyoming Department of Environmental Quality (WYDEQ). In accordance with Section L of this Consent Decree, Frontier requested that Trihydro Corporation (Tribydro) perform a review and verification of the BWON Program and prepare a revised 2008 TAB Report. Trihydro conducted the review during 2009 and a report entitled "Benzene Waste Operations NESHAP Compliance Review and Verification Report" was delivered to the Refinery detailing the findings of the review and verification. Based on that review, the revised 2008 TAB quantity was estimated to be 17.43 Mg. With a revised TAB quantity of greater than 10 Mg, the Refinery is now an affected facility under BWON and subject to all the BWON Program Enhancements of its Consent Decree.

As required by the EPA Consent Decree Section L, Paragraph 94, Frontier is developing a plan to comply with the 6BQ compliance option. This plan must specifically identify a compliance strategy and schedule that will be implemented to ensure that Cheyenne complies with the 6BQ option as soon as practicable but by no later than December 31, 2010. This plan is currently being developed by Cheyenne for submittal later in 2010. This 2009 TAB report reflects changes for the 2009 calendar year. It does not include changes resulting from final implementation of the compliance plan still under development. The 2009 TAB quantity for Cheyenne is estimated to be 14.49 Mg. As the Refinery does not yet have to comply with the 6BQ compliance option, the 6BQ limit contributions are not being reported for 2009.

1.2 ANNUAL PROCESS

Throughout the year, Cheyenne has been monitoring compliance with the BWON regulation through quarterly sampling and reporting. Cheyenne conducts quarterly BWON sampling based upon the Sampling Plan required in accordance with the Consent Decree. In addition, the Refinery reviews process changes to determine if changes are

required to be made to the TAB report. Cheyenne is also currently developing a plan for complying with the 6BQ compliance option.

In addition to these activities, Cheyenne requested that Trihydro prepare the 2009 TAB Report. In preparing the 2009 TAB Report, Trihydro completed the following tasks:

- Conducted an on-site visit to collect information related to 2009 operations as part of the compliance review and verification required by the Consent Decree.
- Gathered sampling and operational data related to 2009 operations.
- Collected spill, waste, and turnaround records for the 2009 calendar year.

Through numerous sampling events and BWON compliance reviews at over 40 different refineries Trihydro has developed a database of process and waste stream benzene concentrations, specific gravities of common refinery products, and flow rates of common waste streams. When data or process knowledge were not available from operations personnel at the Refinery or other sources, this database of information was used. As a general practice, the hierarchy of data sources that Trihydro used to develop the 2009 TAB is as follows:

1. Concentration and flow data determined from a sampling event or metering in the current year of reporting at the Refinery.
2. Concentration and flow data determined from a sampling event or metering in a prior year at the Refinery.
3. Concentrations and flow data determined from the Trihydro database.

1.3 SAMPLING DATA

Concentration and flow data determined from a sampling event or metering in the current year is the preferred information to be used to develop the TAB. A summary of the 2009 sampling data obtained by Trihydro is provided in Table 1.1. Trihydro database information used for the development of the 2009 TAB quantity is provided in Table 1.2.



2.0 2009 TOTAL ANNUAL BENZENE REPORT

2.1 INTRODUCTION

The 2008 TAB report for the Refinery was revised based on the Consent Decree required compliance review conducted by Trihydro in 2009. During this review, information was obtained from interviews with operations personnel, sampling activities, records reviews, and onsite observations. The revised 2008 TAB report was submitted by Frontier in March 2010.

The 2009 TAB report has been updated by Trihydro in conjunction with Frontier personnel to reflect 2009 operations and is provided in Appendix A. This section includes a discussion of the information used to develop the 2009 TAB quantity by process unit. Sample data used to complete the TAB were collected in conjunction with the compliance review and provided in Table 1.1. Information was obtained for select waste streams from Frontier personnel including flow data, spill records, vacuum truck transfers, and waste shipped off site. This section outlines some of the key assumptions made when estimating the TAB quantity for each unit at the Refinery.

2.2 COKER – UNIT 36

Wastes associated with the Coker Unit are provided in Table 2.0. The flow rate for the Coker Makeup/Drill Water was updated to reflect 2009 operations. The remaining POGs were unchanged from the revised 2008 TAB report. The TAB quantity from this unit in 2008 was 5.13 Mg while the 2009 TAB quantity was estimated to be 5.12 Mg.

2.3 CRUDE – UNIT 25

Wastes associated with the Crude Unit are provided in Table 3.0. The flow rate for the Desalter Effluent was updated to reflect 2009 operations. The remaining POGs were unchanged from the revised 2008 TAB report. The TAB quantity from this unit in 2008 was 7.53 Mg while the 2009 TAB quantity was estimated to be 6.07 Mg.

2.4 SOUR WATER STRIPPER – UNIT 26

Wastes associated with the Sour Water Stripper Unit are provided in Table 4.0. The flow rate for the Sour Water Stripper Effluent to the Crude Unit's Seal Drum via the Process Sewer was updated for 2009. The remaining POGs were unchanged from the revised 2008 TAB report. The TAB quantity from this unit in 2008 was 0.048 Mg while the 2009 TAB quantity was estimated to be 0.041 Mg.

2.5 DISTILLATE HYDROTREATER – UNIT 32

Wastes associated with the Distillate Hydrotreater Unit are provided in Table 5.0. The TAB quantity from this unit for 2009 is estimated to be 0.006 Mg; this is the same benzene quantity as was reported in the revised 2008 TAB Report.

2.6 SCANFINING/NAPHTHA HYDROTREATER – UNIT 20

Wastes associated with the Scanfining/Naphtha Hydrotreater Unit are provided in Table 6.0. The TAB quantity from this unit for 2009 is estimated to be 0.02 Mg; this is the same benzene quantity as was reported in the revised 2008 TAB Report.

2.7 FLUID CATALYTIC CRACKING – UNIT 20

Wastes associated with the Fluid Catalytic Cracking Unit (FCCU) are provided in Table 7.0. The TAB quantity from this unit for 2009 is estimated to be 0.02 Mg; this is the same benzene quantity as was reported in the revised 2008 TAB Report.

2.8 HYDROBON – UNIT 27

Wastes associated with the Hydrobon Unit are provided in Table 8.0. The TAB quantity from this unit for 2009 is estimated to be 0.02 Mg; this is the same benzene quantity as was reported in the revised 2008 TAB Report.

2.9 PLATFORMER – UNIT 31

Wastes associated with the Platformer Unit are provided in Table 9.0. The TAB quantity from this unit for 2009 is estimated to be 0.01 Mg; this is the same benzene quantity as was reported in the revised 2008 TAB Report.

2.10 AMINE TREATER – UNIT 24

Wastes associated with the Amine Treater Unit are provided in Table 10.0. The TAB quantity from this unit in 2009 is estimated to be 1.51 Mg; this is the same benzene quantity as was reported in the revised 2008 TAB Report.

2.11 GAS CONCENTRATION – UNIT 28

Wastes associated with the Gas Concentration (Gas Con) Unit are provided in Table 11.0. There are three sour water POGs in this unit. The rule allows a facility to characterize the benzene content of sour water streams at the effluent of the sour water stripper. These streams are listed as POGs in the table, but do not contribute to the TAB quantity.

2.12 ALKYLATION MEROX – UNIT 35

Wastes associated with the Alkylation Merox Unit are provided in Table 12.0. The Alkylation and Merox Units contribute less than 0.001 Mg to the 2009 TAB quantity; this is the same benzene quantity as was reported in the revised 2008 TAB Report.

2.13 BUTAMER – UNIT 37

Wastes associated with the Butamer Unit are provided in Table 13.0. There are four sour water POGs in the Butamer Unit. The rule allows a facility to characterize the benzene content of sour water streams at the effluent of the sour water stripper. These streams are listed as POGs in the table, but do not contribute to the TAB quantity.

2.14 NEW AMINE – UNIT 34

The New Amine Unit is currently not operational. The potential POGs associated with this unit are included in Table 14.0 for future reference but do not contribute to the TAB quantity.

2.15 #3 SULFUR RECOVERY – UNIT 23

The #3 Sulfur Recovery Unit does not have POGs that contain benzene. Table 15.0 is included as a place holder in the event that POGs are added in the future.

2.16 STORAGE AND HANDLING

Wastes associated with storage and handling are provided in Table 16.0. The TAB quantity from storage and handling in 2008 was 0.76 Mg while the 2009 TAB quantity was calculated as 0.31 Mg. This decrease in the TAB quantity is due to a change in the operation of Tank 36. Slop oil from the FCCU and Crude Units are routed to this tank for storage prior to being routed to Tank 75. Tank 75 is one of the Crude Unit feed tanks. In 2008, Tank 36 contained approximately 25 percent water on an annual basis. In 2009, Tank 36 contained less than 10 percent water on an



annual basis. Currently, Tank 36 is operated as a dry slop tank (containing less than 10 percent water) rather than as a wet slop tank. This operational change allows the benzene quantity of the organic slop oil waste to be removed from the TAB quantity.

2.17 LABORATORY WASTE

Wastes associated with the laboratory are provided in Table 17.0. The TAB quantity from laboratory waste for 2009 is 0.07 Mg; this is the same benzene quantity as was reported in the revised 2008 TAB Report.

2.18 SPILLS AND MISCELLANEOUS

Spills and miscellaneous wastes are provided in Table 18.0. Spill records from 2009 were provided by Cheyenne personnel. The contribution of spills to the 2009 TAB quantity is 0.009 Mg.

Miscellaneous waste streams include a flare knockout drum, spent caustic shipped offsite, and various vacuum truck transfers not accounted for in individual process units. The contribution to the 2009 TAB quantity for these wastes is 1.24 Mg.

2.19 SOLID WASTE

Refinery personnel provided a list of solid waste shipped off site in 2009. Solid wastes are included in the 2009 TAB report in Table 19.0. Solid waste quantities were obtained from the Refinery's solid waste records and benzene concentrations are based upon similar streams at other refineries. Solid waste accounted for approximately 0.03 Mg of benzene to the 2009 TAB quantity.

2.20 MAINTENANCE AND TURNAROUND

Wastes associated with maintenance and turnaround activities are provided in Table 20.0. Trihydro typically breaks these wastes out on a unit-by-unit basis and itemizes each piece of equipment to provide a more accurate listing of the individual POGs. Maintenance wastes were calculated by using the same assumptions as were used in the revised 2008 TAB calculations.

The 2009 TAB Report includes a benzene contribution estimate for each piece of equipment in each unit and utilizes benzene concentrations based on the service of each piece of equipment. A turnaround schedule was provided by

Frontier personnel. The units that underwent turnaround in 2009 were the Hydrogen Plant, Boilers and portions of the Wastewater Treatment Plant. Wastes from the Hydrogen Plant and Boilers do not contribute to the TAB quantity because these wastes do not contain benzene. Wastes generated from the partial turnaround of the Wastewater Treatment Plant are not included in the TAB quantity to avoid double counting the benzene.

Pumps that are used to transfer benzene-containing materials have at least one maintenance event associated with them. The number of maintenance events associated with the pumps in a process unit are based on information obtained during operator interviews. Maintenance waste contributes approximately 0.02 Mg of benzene to the 2009 TAB quantity.

3.0 SUMMARY

The 2009 TAB quantity for the Refinery is estimated to be 14.49 Mg. The main change in the 2009 TAB quantity is associated with updated flow rates for various waste streams. The Coker and Crude units remain the largest contributors to the 2009 TAB quantity.

TABLES

TABLE 1.1. BWON PROGRAM REVIEW SAMPLE RESULTS 2009
FRONTIER REFINING INC., CHEYENNE, WYOMING

Unit	Sample Description	Sample ID	Equipment No./Description	Location	Date	Time	Benzene Concentration Organic (mg/kg)	Benzene Concentration Aqueous (mg/L)	Hydrocarbon Density (lbs/ft ³)	Comments
Tank Farm 2	Diesel Tank-Hydrocarbon	TK-16-HC	Tank 16	Valve	6/16/09 6/17/09 6/18/09	1020 1100 0915	ND(200) 41.00 44.00	-- -- --	-- -- --	Grab Samples
	Average:						61.67			
Tank Farm 2	Light Cycle Oil (LCO) Tank-Water	TK-17-W	Tank 17	Valve	6/15/09 6/16/09 6/17/09	1010 1055 1040	44.00 44.00 50.00	45.83* 45.83* 49.82*	-- -- --	Grab Samples
	Average:						46.00	47.16		
Tank Farm 2	Light Cycle Oil (LCO) Tank-Hydrocarbon	TK-17-HC	Tank 17	Valve	6/15/09 6/16/09 6/17/09	1015 1045 1038	ND(40) ND(100) 40.00	-- -- --	59.3 -- --	Grab Samples
	Average:						36.67		59.3	
Tank Farm 2	Coker Distillate-Water	TK-22-W	Tank 22	Valve	6/15/09 6/16/09 6/17/09	1025 1110 1015	-- ND(2) --	0.02 -- 0.02	-- -- --	Grab Samples
	Average:						1.00	0.02	59.3	
Tank Farm 2	Coker Distillate-Hydrocarbon	TK-22-HC	Tank 22	Valve	6/15/09 6/16/09 6/17/09	1056 1100 1010	ND(100) ND(100) ND(20)	-- -- --	53.5 -- --	Grab Samples
	Average:						36.67		53.5	
Tank Farm 2	Coker Gas Oil-Water	TK-23-W	Tank 23	Valve	6/15/09 6/16/09 6/17/09	1105 1145 0949	-- -- --	0.11 0.22 0.27	-- -- --	Grab Samples
	Average:							0.20		
Tank Farm 2	Coker Gas Oil-Hydrocarbon	TK-23-HC	Tank 23	Valve	6/15/09 6/16/09 6/17/09	1100 1140 0955	45.00 48.00 63.00	-- -- --	59.7 -- --	Grab Samples
	Average:						52.00		59.7	
Tank Farm 2	Burner/Distillate-Water	TK-62-W	Tank 62	Valve	6/15/09 6/16/09	1111 1155	-- --	0.30 0.30	-- --	Grab Samples
	Average:							0.30		
Tank Farm 2	Burner/Distillate-Hydrocarbon	TK-62-HC	Tank 62	Valve	6/15/09 6/16/09	1115 1150	ND(200) ND(200)	-- --	-- --	Grab Samples
	Average:						100.00			

TABLE 1.1. BWON PROGRAM REVIEW SAMPLE RESULTS 2009
FRONTIER REFINING INC., CHEYENNE, WYOMING

Unit	Sample Description	Sample ID	Equipment No./Description	Location	Date	Time	Benzene Concentration Organic (mg/kg)	Benzene Concentration Aqueous (mg/L)	Hydrocarbon Density (lbs/ft ³)	Comments
Tank Farm 2	Heavy Naphtha/Light Straight Run-Hydrocarbon	TK-63-HC	Tank 63	Valve	6/16/09	1030	5600.00	—	—	Grab Samples
					6/17/09	1020	6500.00	—	—	
					6/18/09	0930	5700.00	—	—	
	Average:						5933.33			
Tank Farm 2	Slop Oil-Water	TK-64-W	Tank 64	Valve	6/17/09	1230	—	12.00	—	Grab Samples
	Slop Oil-Water	TK-64-W			6/18/09	0940	—	0.12	—	
	Slop Oil-Water	TK-64-W			6/19/09	0930	—	8.10	—	
	Blind Duplicate	BD61909			6/19/09	—	—	8.10	—	
	Average:							7.08		
Tank Farm 2	Unleaded Gasoline-Hydrocarbon	TK-71-HC	Tank 71	Valve	6/16/09	1038	25000.00	—	—	Grab Samples
	Blind Duplicate	Blind Dup			6/16/09	—	17000.00	—	—	
	Unleaded Gasoline-Hydrocarbon	TK-71-HC			6/17/09	1030	9000.00	—	—	
	Unleaded Gasoline-Hydrocarbon	TK-71-HC			6/18/09	0935	8000.00	—	—	
	Average:						14750.00			
Tank Farm 2	Slop Oil-Hydrocarbon	TK-75-HC	Tank 75	Valve	6/16/09	1120	5500.00	—	—	Grab Samples
	Blind Duplicate	BD61609-HC			6/16/09	—	5500.00	—	—	
	Slop Oil-Hydrocarbon	TK-75-HC			6/17/09	0945	6000.00	—	—	
	Slop Oil-Hydrocarbon	TK-75-HC			6/18/09	0920	5100.00	—	—	
	Average:						5525.00			
Tank Farm 2	Slop Oil-Water	TK-75-W	Tank 75	Valve	6/16/09	1130	—	12.00	—	Grab Samples
	Blind Duplicate	BD61609-W			6/16/09	—	—	11.00	—	
	Slop Oil-Water	TK-75-W			6/17/09	0940	—	14.00	—	
	Slop Oil-Water	TK-75-W			6/18/09	0925	—	9.30	—	
	Average:							11.58		
Tank Farm 2	Diesel Tank-Hydrocarbon	TK-101-HC	Tank 101	Valve	6/17/2009	1025	42.00	—	—	Grab Sample
	Average:						42.00			
Crude	Desalter Effluent	Desalter Effluent	25-D-712	Dedicated	6/16/09	1525	—	25.00	—	Cooled to below 10C
	Desalter Effluent				6/17/09	1210	—	29.00	—	
	Blind Duplicate	BD61709			6/17/09	—	—	31.00	—	
	Desalter Effluent				6/18/09	1320	—	31.00	—	
	Average:							29.00		
Crude	Desalter Crude	Desalter Crude	25-D-712	Sample Point	6/16/09	1500	1300.00	—	54.3	Grab Samples
					6/17/09	1130	1400.00	—	—	
					6/18/09	1310	1400.00	—	—	
	Average:						1366.67		54.3	

TABLE 1.1. BWON PROGRAM REVIEW SAMPLE RESULTS 2009
FRONTIER REFINING INC., CHEYENNE, WYOMING

Unit	Sample Description	Sample ID	Equipment No./Description	Location	Date	Time	Benzene Concentration Organic (mg/kg)	Benzene Concentration Aqueous (mg/L)	Hydrocarbon Density (lbs/ft ³)	Comments			
Scansiner	Fuel Gas Coalescer	Fuel Gas Coalescer	32-D-015	Valve	6/17/09	1435	—	2.90	—	Grab Samples			
	Fuel Gas Coalescer	Fuel Gas Coalescer			6/18/09	0859	—	5.30	—				
	Fuel Gas Coalescer	Fuel Gas Coalescer			6/19/09	1055	—	3.30	—				
	Blind Duplicate	Blind Dup			6/19/09	—	—	3.30	—				
	Average:									3.70			
Platformer	Diesel Salt Dryer-Water	Diesel Salt Dryer-W	32-D-0017	Valve	6/17/09	1450	—	0.04	—	Grab Samples			
	Average:									0.02			
Platformer	Diesel Salt Dryer-Hydrocarbon	Diesel Salt Dryer-HC	32-D-0017	Valve	6/17/09	1455	29.00	—	—	Grab Samples			
	Average:									41.00			
Coker	Flare Tower Water Seal	Flare Water	Valve	Clear Water Tank-Pump	6/17/09	1530	750.00	—	—	Grab Sample; Headspace in VOAs Grab Sample; Headspace in VOAs			
	Average:									750.00			
										1.60			
Coker	Coker Drill Water	Coker Drill Water	Pump	Clear Water Tank-Pump	6/16/09	0905	—	0.03	—	Grab Samples			
	Average:									0.01			
Coker	Coker Settling Drum-Hydrocarbon	Coker Sett. Drum-HC	36-D-714 to TK-1003	Valve	6/16/09	0936	320.00	—	57.6	Grab Samples			
	Average:									0.90			
Coker	Coker Settling Drum-Water	Coker Sett. Drum-W	36-D-714	Valve	6/16/09	0934	—	2.40	—	Grab Samples			
	Average:									1.60			
Coker													
	Average:									1.52			

TABLE 1.1. BWON PROGRAM REVIEW SAMPLE RESULTS 2009
FRONTIER REFINING INC., CHEYENNE, WYOMING

Unit	Sample Description	Sample ID	Equipment No./Description	Location	Date	Time	Benzene Concentration Organic (mg/kg)	Benzene Concentration Aqueous (mg/L)	Hydrocarbon Density (lbs/ft ³)	Comments
Amine	Rich Amine Flash Drum	Amine Flash	24-D-0004	Valve	9/4/09 9/4/09 9/4/09	1115 1115 BD	1150.00 1170.00 1100.00 1140.00	— — — —	50.4 50.8 50.5 50.6	Grab Samples
	Average:									
WWTP	API Influent**	API Water		Pump	3/9/09 3/9/09 3/9/09 5/19/09 5/19/09 5/19/09	1125 1339 1618 1040 1100 1120	— — — — — —	5.04 5.62 3.94 7.90 7.10 7.30 6.16	— — — — — — —	Cooled to below 10C
	Average:									
WWTP	API Slop Oil	API HC	Tank 41	Pump	3/9/09 3/9/09 3/9/09 5/19/09 5/19/09 5/19/09	1110 1335 1623 0950 1035 1050	654.00 589.00 621.00 2100.00 1900.00 1900.00 1294.00	— — — — — — —	— — — — — — —	Grab Samples
	Average:									
NA	Trip Blanks	TB61509 TB61609 TB61709 Trip Blank Trip Blank	NA NA NA NA NA	NA NA NA NA NA	6/15/09 6/16/09 6/17/09 6/18/09 6/19/09	0730 1015 0920 — —	— — — — —	ND(.001) ND(.001) ND(.001) ND(.001) ND(.001)	— — — — —	Grab Samples
	Average:									
NA	Field Blanks	FB61509 FB61609 FB61709 FB61809 FB61909	NA NA NA NA NA	NA NA NA NA NA	6/15/09 6/16/09 6/17/09 6/18/09 6/19/09	1120 1010 0925 0905 925	— — — — —	ND(.001) ND(.001) ND(.001) 0.00 ND(.001)	— — — — —	Grab Samples
	Average:									
NA	Equipment Blanks	EBC61509 EBB61509 EBA61509	Cooler C Cooler B Cooler A	NA NA NA	6/15/09 6/15/09 6/15/09	0715 0720 0725	— — —	ND(.001) ND(.001) ND(.001) ND(.001)	— — — —	Cooler Samples
	Average:									

Notes:

ND(00)- Non Detect (detection limit); use one-half detection limit to calculate average benzene concentrations.

Grab samples were collected in new 250ml plastic bottles, new 1L tin bottles, or new 1 L glass jars for almost every sample and transferred into 40ml VOAs.

* Laboratory reported an aqueous sample result in mg/kg; converted to mg/L using density of 62.21 lb/ft³.

** API effluent was sampled but labeled as API influent

**TABLE 1.2. TRIHYDRO DATABASE SAMPLE RESULTS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Unit	POG Name	Database ID	Density lb/ft ³	Benzene Concentration Aqueous (mg/L)	Benzene Concentration Organic (mg/kg)	Range of Benzene Concentrations (ppmw)
Crude - Unit 25	Reduced Crude Pumps	Crude, Reduced	59.7	0.00	0.19	0.13 - 0.31
	AGO Pumparound Pumps	Crude - Gas Oil	57.5	1.33	133.49	0.22 - 400.00
	Crude Overhead Reflux Pumps	Crude - Atmospheric Tower Reflux	39.6	78.50	22000.00	69.00 - 22000.00
	Atmospheric Gas Oil Product Pumps	Crude - Gas Oil	57.5	1.33	133.49	0.22 - 400.00
	HVGO Pumps	Gas Oil, Heavy	59.7	0.19	19.49	0.13 - 58.10
	Vacuum Diesel Product Pumps	Vacuum - Diesel, Vacuum	55.9	0.01	0.50	0.01 - 0.50
	Naphtha Splitter Overhead Reflux Pumps	Naphtha, Light	41.7	376.00	37600.00	340.00 - 39500.00
	Stabilizer Charge Pumps	Stabilizer Feed	39.6	95.93	26666.67	82.70 - 27000.00
	Stabilizer Overhead Reflux Pumps	Stabilizer Liquid	28.7	27.46	2746.00	1.25 - 5680.00
	Naphtha Splitter Bottoms Pumps	Naphtha, Heavy	46.3	94.97	9496.67	92.10 - 9890.00
	Vacuum Residue Pumps	Gas Oil, Heavy Vacuum	59.8	0.00	0.50	0.50 - 0.50
	Vacuum Off-Gas Compressor	Crude Vacuum Tower Overhead	51.8	5.80	580.00	5.80 - 580.00
	Second Stage Compressor KO Drum	Knockout Water, Compressor	46.8	5.10	510.00	5.10 - 510.00
	Off Gas KO Drum	Water, Blowdown	45.6	18.17	1817.00	6.80 - 3400.00
	Fuel Gas Surge Pot	Coker - Knockout Water, Fuel Gas	45.3	0.14	14.00	0.06 - 17.00
	Sour Water Streams	SWS - Sour Water	0.0	18.27	0.00	0.28 - 28.00
	Light Straight Run Streams	Gasoline, Light Straight Run	39.6	115.13	36040.00	42.00 - 43000.00
	Burner Product Streams	Kerosene	50.5	2.52	214.88	0.40 - 640.00
Scanning/ Naphtha Hydrotreater - Unit 20	Merex Catalyst Addition Pot	Storage - Gasoline, Regular Unleaded	44.9	36.71	7817.22	13.50 - 18500.00
	Stripper Bottoms	Storage - Gasoline, Regular Unleaded	44.9	36.71	7817.22	13.50 - 16500.00
	Run Down	Storage - Gasoline, Regular Unleaded	44.9	36.71	7817.22	13.50 - 16500.00
	Product Stripper Reboiler	Hydrotreater, Naphtha - Naphtha	43.7	209.00	20900.00	41.00 - 97000.00
	Stripper Reflux Pump	Hydrotreater, Naphtha - Naphtha	43.7	209.00	20900.00	41.00 - 97000.00
	Amine Scrubber	Amine, Stripper Reflux	68.6	0.01	1.00	0.01 - 1.00
	Lube Oil Main/Stand-by Pump	Crude - Lube Oil	50.0	0.00	0.50	0.50 - 0.50
	Reactor Product Separator/Stripper Feed and Bottoms Exchangers	Hydrotreater, Naphtha - Naphtha	43.7	209.00	20900.00	41.00 - 97000.00
	Stripper Overhead/Stripper Reflux	Hydrotreater, Naphtha - Naphtha, Light	43.7	62.98	6298.00	21.20 - 10000.00
	Wash Water Recirculation Pump	Hydrotreater, Naphtha - Stripper Water	44.2	34.50	22000.00	20.00 - 22000.00
Fluid Catalytic Cracking - Unit 34	Caustics	Hydrotreater, Kerosene - Caustic, Spent	51.5	7.53	753.00	6.50 - 870.00
	Feed Streams	Naphtha Hydrotreater - Charge	46.7	61.00	5247.50	61.00 - 9000.00
	Lube Oil	NHT, Seal Oil Compressor	50.0	0.00	0.50	0.50 - 0.50
	Fuel Gas Coalescer	Reformer - Knockout Water, Fuel Gas	45.3	2.85	285.00	2.50 - 320.00
	1st Stage Oil Reclaimer Filter	Storage - Gas Oil, Vacuum	56.4	0.12	2.54	0.09 - 8.10
	2nd Stage Oil Reclaimer Filter	Storage - Gas Oil, Vacuum	56.4	0.12	2.54	0.09 - 8.10
	Filter associated with 134A & B Lube Oil Cooler	FCC - Lube Oil	49.1	0.02	2.34	0.02 - 19.00
	Charge Tank 23 (Coker Gas Oil)	Coker - Gas Oil, Combined	51.2	0.84	84.33	0.46 - 110.00
	Ph Check of Overhead Receiver Water Boot	FCC - Fractionator Overhead	44.0	92.06	9206.00	12.70 - 24000.00
	FCC Combined Feed	FCC - Feed, Combined	56.2	0.20	19.83	0.01 - 82.50
Sour Water Boot Pump Sample	FCC Slurry	FCC - Slurry	64.7	0.60	60.44	0.02 - 162.00
	FCC LCO	FCC - Cycle Oil, Light	57.4	0.86	85.60	0.05 - 355.00
	Interstage KO Drum	FCC - Sour Water	47.0	37.89	0.00	17.00 - 77.10
	Overhead Receiver	FCC - Interstage Liquid	43.4	163.50	16350.00	120.00 - 20700.00
	Sponge Oil Pump	FCC - Fractionator Overhead	44.0	92.06	9206.00	12.70 - 24000.00
		Sponge Oil	60.1	0.33	325.00	0.24 - 474.00

**TABLE 1.2. TRIHYDRO DATABASE SAMPLE RESULTS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Unit	POG Name	Database ID	Density lb/ft ³	Benzene Concentration Aqueous (mg/L)	Benzene Concentration Organic (mg/kg)	Range of Benzene Concentrations (ppmw)
Amine Treater Unit 24	Reflux Accumulator LP Gas KO/Contactor	Gas Con - Amine, Stripper Reflux Reformer - Knockout Water, Fuel Gas	68.6 45.3	0.01 2.85	1.00 285.00	0.01 - 1.00 2.50 - 320.00
Sour Water Stripper Unit 26	Sour Water Stripper Tower Sour Water Line Laboratory - SWS Charge SWS OVHD/Feed Quench Water Skim Oil Transfer Pumps Lean/Rich Amine Exchanger	SWS - Sour Water Stripper Effluent SWS - Sour Water SWS - Sour Water SWS - Sour Water SWS - Quench Water SWS - Sour Water Oil Skim Gas Con - Amine Circulating	49.2 0.0 0.0 49.2 49.2 50.4 0.0	0.20 18.27 18.27 0.07 0.00 5339.44 0.46	0.00 0.00 0.00 0.00 0.00 77.00 - 20990.00 0.00	0.0005 - 4.83 0.28 - 28.00 0.28 - 28.00 0.28 - 61.00 0.05 - 0.08 0.03 - 1.25
Hydrobon Unit 27	Charge Sample/Feed Exchanger/Product Separator and Condenser Debutanizer Bottoms Hydrobon Product Separator Water Boot Debutanizer Receiver Water Boot	Naphtha Hydrotreater - Charge Naphtha Hydrotreater - Debutanizer Bottoms Hydrotreater, Naphtha - Naphtha, Light Naphtha Hydrotreater - Debutanizer Overhead	46.7 44.3 43.7 38.0	61.00 0.00 62.98 95.67	5247.50 10291.67 6298.00 9567.00	61.00 - 9000.00 2010.00 - 17700.00 21.20 - 10000.00 20.00 - 18000.00
Platformer Unit 31	High Pressure Separator Stabilizer Bottoms	Reformer - Stabilizer Overhead Reformer - Stabilizer Bottoms	45.3 50.9	3.68 121.58	133.00 28590.00	0.17 - 133.00 39.00 - 40000.00
Distillate Hydrotreater Unit 32	Unifiner Stripper Bottoms Amine Absorber	Diesel Hydrotreater - Diesel Product Hydrotreater, Diesel - MDEA, rich	53.2 65.7	0.00 0.00	1.67 1.80	0.0005 - 3.30 1.70 - 1.90
Alkylation Merox Unit 35	ASO Scrubber Sample Purge Alkylation, Spent Caustic Alkylate/Isostripper Fuel Gas KO Pot Naphtha/Field Butane/Isostripper Feed	Acid Soluble Oil Spent Caustic from Caustic Prewash Scrubber Alkylate Knockout Water, Fuel Gas Naphtha	62.0 64.2 43.2 45.3 45.5	0.00 0.31 1.03 0.14 73.49	0.46 11.79 53.25 14.00 5529.75	0.39 - 0.50 0.10 - 20.00 0.70 - 76.50 0.06 - 17.00 2.65 - 12100.00
Coker Unit 36	Wash Oil Strainer Gas Oil Reflux Strainer Gas Oil Reflux Strainer Bottoms Screen Bottoms Screen Blowdown Tower Screen Condensate Screens for D-707 Condensate/OH Condenser/Condensate Pump Strainer for TK-1004 effluent Flare Knockout Drum Flare Igniter Fuel Gas Knockout Coker Fuel Gas KO Drum POGs associated with Coker Compressors Coker Naphtha Coker Stabilizer Coker Fractionator Coker Sour Water Coker Flare KO Drum Sponge Oil Pump	Wash Oil Gas Oil, Combined Gas Oil, Combined Crude - Reduced Crude Crude - Reduced Crude Gas Oil, Light Gas Oil, Light Condensate WWTP - Sludge, Primary Knockout Water, Flare Knockout Water, Fuel Gas Knockout Water, Fuel Gas Knockout Water, Compressor Coker Naphtha Coker Stabilizer Bottoms Coker Fractionator Reflux Coker Sour Water Coker - Blowdown Sponge Oil	51.2 51.2 51.2 59.7 59.7 53.9 53.9 59.6 66.8 59.2 45.3 45.3 46.8 46.8 46.4 46.5 46.8 57.6 60.1	0.00 0.84 0.84 0.00 0.00 0.00 0.00 0.35 35.70 0.62 0.14 0.14 5.10 336.67 216.67 14.50 1.39 4.00 0.33	0.30 84.33 84.33 0.19 0.19 19.37 19.37 35.00 87.29 478.50 14.00 14.00 510.00 1983.33 2975.00 1450.00 139.00 320.00 325.00	0.125 - 0.65 0.46 - 110.00 0.46 - 110.00 0.13 - 0.31 0.13 - 0.31 18.00 - 20.80 18.00 - 20.80 0.05 - 135.00 15.00 - 210.00 0.15 - 750.00 0.06 - 17.00 0.06 - 17.00 5.10 - 510.00 270.00 - 3100.00 180.00 - 3200.00 12.20 - 1780.00 0.50 - 240.00 0.90 - 320.00 0.24 - 474.00

**TABLE 1.2. TRIHYDRO DATABASE SAMPLE RESULTS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Unit	POG Name	Database ID	Density lb/ft ³	Benzene Concentration Aqueous (mg/L)	Benzene Concentration Organic (mg/kg)	Range of Benzene Concentrations (ppmw)
Gas Con Unit 28	Stripper Feed/Reboiler	Crude - Stabilizer Liquid	28.7	27.46	2746.00	1.25 - 5680.00
	Debutanizer OVHD	Crude - Debutanizer Overhead	37.5	0.30	0.00	0.08 - 0.62
	Debutanizer Bottoms/Reboiler Pump/Heater	Crude - Debutanizer Bottoms	42.4	348.00	34840.00	348.00 - 34840.00
	Absorber/Primary Bottoms	Storage - Gasoline, Regular Unleaded	44.9	36.71	7817.22	13.50 - 16500.00
	Secondary Absorber	FCC - Sponge Oil, Rich	60.1	0.00	325.00	236.00 - 474.00
	Fuel Gas Knockout Pot	Hydrocracker - Knockout Water, Fuel Gas	45.6	31.50	3150.00	31.50 - 3150.00
Storage and Handling	TK-20	Gas Oil	57.5	0.19	19.49	0.12 - 58.18
	TK-21	Gas Oil	57.5	0.19	19.49	0.12 - 58.18
	TK-28	Gas Oil	54.7	2.44	281.30	0.05 - 460.00
	TK-34	Reformate, Light	50.1	57.78	12364.00	7.99 - 39000.00
	TK-35	Alkylate	43.2	1.03	53.25	0.70 - 76.50
	TK-60	Toluene	53.7	5.00	500.00	5.00 - 500.00
	TK-61	Naphtha	45.5	73.49	5529.75	2.65 - 12100.00
	TK-67	Naphtha	45.5	73.49	5529.75	2.65 - 12100.00
	TK-70	Gasoline, Regular Unleaded	44.9	36.71	7817.22	13.50 - 16500.00
	Coker Naphtha Pump	Coker Naphtha	46.8	336.67	1983.33	270.00 - 3100.00
	TK-74	Gas Oil, Heavy	59.7	0.19	19.49	0.13 - 58.10
	TK-100	Gasoline, Light Straight Run	40.4	196.88	19688.00	13.00 - 39700.00
	TK-102	Gasoline, Regular Unleaded	44.9	36.71	7817.22	13.50 - 16500.00
	TK-104	Gasoline, Light Cat	45.7	69.12	6873.64	14.00 - 12100.00
Laboratory Waste	HSR	Gasoline, Heavy Straight Run	48.1	0.85	6138.33	0.63 - 9600.00
	LVGO	Gas Oil, Virgin	53.9	1.40	140.00	5.01 - 387.00
	Reformer Feed	Charge	45.3	22.50	18820.83	22.00 - 46000.00
	Reformer Stab Reflux	Reformer Stabilizer Liquid	51.4	0.66	66.00	0.01 - 473.00
	DHDS Feed	DHT - Feed	53.6	0.79	44.84	0.20 - 63.40
	DHDS Stripper Bottoms	Fractionator Bottoms	58.1	0.00	1.32	0.25 - 3.50
	Amine III Rich Amine	DEA, Rich	63.0	40.65	5566.67	16.30 - 7400.00
	Amine IV Rich Amine	DEA, Rich	63.0	40.65	5566.67	16.30 - 7400.00
	Amine IV Wash Water	Water Wash Tower	60.1	3.81	0.00	0.04 - 9.56
	Rich MDEA	DEA, Rich	63.0	40.65	5566.67	16.30 - 7400.00
	FCC Feed	Feed, Fresh	57.2	0.68	6.75	0.50 - 26.00
	Diesel Tank	Diesel, Low Sulfur	53.4	2.52	210.13	0.05 - 940.00
Spills and Misc.	Flare Knockout Drum	Average of Flare Knockout Water Sample Results	48.6	15.88	2689.00	0.04 - 11600.00
	Spent Caustic Shipped Offsite	Average of Spent Caustic Sample Results	58.0	5.01	479.30	0.005 - 2913.25
	Vacuum Truck Movements - MOSC prior to recycle	Coker Slop Oil	59.6	0.20	36.82	0.05 - 110.00
	IAF - Water	DNF Effluent	55.0	56.20	5620.00	56.20 - 5620.00
	Cooling Tower #2	Cooling Tower	0.0	0.01	0.00	0.009 - 0.01
	Boundary Well	Groundwater	50.7	44.00	66.00	44.00 - 66.00
	Regular Unleaded Gasoline	Storage - Gasoline, Regular Unleaded	44.9	36.71	7817.22	13.50 - 16500.00
Waste Shipped Off Site	Drain Sludge	Wastewater Treatment Primary Sludge	66.8	35.70	87.29	35.70 - 87.29
	Slop Oil	Wastewater Treatment Slop Oil	55.6	37.41	1989.04	37.41 - 1989.04

APPENDIX A

2009 TOTAL ANNUAL BENZENE REPORT

TABLE A.1.0. TOTAL ANNUAL BENZENE SUMMARY 2009
FRONTIER REFINING INC., CHEYENNE, WYOMING

Source	Table	Total Annual Benzene (Mg)
Coker - Unit 36	A.2.0	5.12463
Crude - Unit 25	A.3.0	6.07025
Sour Water Stripper - Unit 26	A.4.0	0.04098
Distillate Hydrotreater - Unit 32	A.5.0	0.00635
Scanfining/Naphtha Hydrotreater - Unit 20	A.6.0	0.01978
Fluid Catalytic Cracking - Unit 34	A.7.0	0.01598
Hydrobon - Unit 27	A.8.0	0.01668
Platformer - Unit 31	A.9.0	0.01379
Amine Treater - Unit 24	A.10.0	1.51155
Gas Concentration - Unit 28	A.11.0	0.00000
Alkylation Merox - Unit 35	A.12.0	0.00000
Butamer - Unit 37	A.13.0	0.00000
New Amine - Unit 21	A.14.0	0.00000
#3 Sulfur Recovery Unit - Unit 23	A.15.0	0.00000
Storage and Handling	A.16.0	0.30811
Laboratory Waste	A.17.0	0.07081
Spills and Miscellaneous	A.18.0	1.24441
Solid Waste	A.19.0	0.02975
Maintenance and Turnaround	A.20.0	0.01781
Total:		14.49089

TABLE A.2.0. COKER - UNIT 36 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
38-FL-537A	Bottoms Screen	Process Wastewater	Uncontrolled	Trough/Vac truck	0	100	59.7	0.00	0.19	0.13 - 0.31	28.61	0.19	0.02	0.00001
38-FL-537B	Bottoms Screen	Process Wastewater	Uncontrolled	Trough/Vac truck	0	100	59.7	0.00	0.19	0.13 - 0.31	28.61	0.19	0.02	0.00001
38-FL-102A	Blowdown Tower Screen	Process Wastewater	Uncontrolled	Coker API	0	100	53.9	0.00	19.37	18.00 - 20.80	4.77	19.37	0.003	0.00008
38-FL-102B	Blowdown Tower Screen	Process Wastewater	Uncontrolled	Coker API	0	100	53.9	0.00	19.37	18.00 - 20.80	4.77	19.37	0.003	0.00008
38-FL-539A	Condensate Screens for D-707	Process Wastewater	Uncontrolled	Coker API	0	100	53.9	0.00	19.37	18.00 - 20.80	4.77	19.37	0.003	0.00008
38-FL-539B	Condensate Screens for D-707	Process Wastewater	Uncontrolled	Coker API	0	100	53.9	0.00	19.37	18.00 - 20.80	4.77	19.37	0.003	0.00008
STK-101	Flare Tower Water Seal Drain	Process Wastewater	Controlled	Coker API	99	1	61.1	1.60	750.00	1.60 - 750.00	9536.42	8.93	5.00	0.0877
38-FL-1427A	Quench Water Strainer	Process Wastewater	Uncontrolled	Coker API	100	0	0.0	0.01	0.00	0.00 - 0.03	9.54	0.01	0.01	0.00000
38-FL-1427B	Quench Water Strainer	Process Wastewater	Uncontrolled	Coker API	100	0	0.0	0.01	0.00	0.00 - 0.03	9.54	0.01	0.01	0.00000
38-FL-0538	Tank 1003 Basket Filter	Process Wastewater	Uncontrolled	Coker API	100	0	0.0	0.01	0.00	0.00 - 0.03	4.39	0.01	0.00	0.00000
NA	Tank 1004 Strainer	Process Wastewater	Uncontrolled	Vac Truck	85	15	66.8	35.70	87.29	15.00 - 210.00	4.39	43.90	0.00	0.00020
38-D-715	Flare Knockout Drum	Process Wastewater	Controlled	Coker API	90	10	59.2	0.62	478.50	0.15 - 750.00	188.82	46.16	0.10	0.00904
38-D-0714	Settling Drum Water	Process Wastewater	Controlled	Coker API	97.5	2.5	57.6	1.52	320.00	0.90 - 320.00	286092.72	8.88	150.00	2.64438
38-D-0714	Settling Drum Hydrocarbon/Water	Process Wastewater	Controlled	Coker Slop Tank 38-TK-1002	50	50	57.6	1.52	320.00	0.90 - 320.00	15258.28	154.38	8.00	2.36120
NA	Make up Coker Drill/Cooling Water	Process Wastewater	Uncontrolled	Air/Evaporation	100	0	0.0	1.03	0.00	0.90 - 1.20	19072.85	1.03	10.00	0.02056
Sample	Distillate Sample Purges	Sample	Uncontrolled	Coker API	0	100	53.5	0.00	36.87	0.02 - 50.00	1.91	38.87	0.001	0.00008
Sample	Gas Oil Samples Purges	Sample	Uncontrolled	Coker API	0	100	59.7	0.00	52.00	45.00 - 63.00	1.91	52.00	0.001	0.00010
38-D-701	Fractionator Ovhd Receiver Water Boot	Sour Water	Controlled	To SWS via 724 SW Surge Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
38-D-710	High Pressure Receiver Water Boot	Sour Water	Controlled	To SWS via 724 SW Surge Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
38-D-0724	Sour Water Surge Drum	Sour Water	Controlled	To Sour Water System Degassing Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
D-200	FGRU KO Drum (Service Liquid Separator)	Sour Water	Controlled	To SWS via 724 SW Surge Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
38-D-711	Stabilizer Overhead Receiver	Sour Water	Controlled	To SWS via 724 SW Surge Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
D-100	Compressor KO Drum	Sour Water	Controlled	To SWS via 724 SW Surge Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000

TAB
(Mg/yr)

5.12463

TABLE A.3.0. CRUDE - UNIT 25 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
25-D-0712	Crude Desalter Effluent	Process Wastewater	Controlled	API Separator	99.5	0.5	54.3	29.00	1366.67	25.00 - 1400.00	121150.73	34.82	63.52	4.39733
25-D-0712	Crude Desalter - Triline Sample Points	Process Wastewater	Uncontrolled	Process Sewer	50	50	54.3	29.00	1366.67	25.00 - 1400.00	40.24	651.42	0.02	0.02556
25-D-0712	Crude Desalter Mudwashings	Process Wastewater	Controlled	API Separator	95	5	54.3	29.00	1366.67	25.00 - 1400.00	3360.64	87.58	1.76	0.30490
25-D-0712	Crude Desalter Upsets	Process Wastewater	Controlled	API Separator	90	10	54.3	29.00	1366.67	25.00 - 1400.00	110.50	148.93	0.08	0.01671
25-D-719	Fuel Gas Surge Pot	Process Wastewater	Uncontrolled	Process Sewer	100	0	0.0	0.14	0.00	0.08 - 17.00	5.72	0.14	0.00	0.00000
25-D-711	Off Gas KO Drum	Process Wastewater	Controlled	Flare System	50	50	45.6	18.17	1817.00	6.80 - 3400.00	1.81	777.77	0.00	0.00134
25-P-501A/B	Crude Charge Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	54.3	0.00	1366.67	25.00 - 1400.00	18.54	1366.67	0.01	0.02299
25-P-502A/B	Crude Heater Charge Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	54.3	0.00	1366.67	25.00 - 1400.00	18.54	1366.67	0.01	0.02289
25-P-503A/B	Reduced Crude Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	59.7	0.00	0.19	0.13 - 0.31	18.54	0.19	0.01	0.00000
25-P-504A/B	AGO Pumparound Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	57.5	0.00	133.49	0.22 - 400.00	18.54	133.49	0.01	0.00238
25-P-506A/B	Distillate Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	53.5	0.00	36.67	0.02 - 50.00	18.54	36.67	0.01	0.00081
25-P-507A/B	Crude Overhead Reflux Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	39.6	0.00	22000.00	69.00 - 22000.00	18.54	22000.06	0.01	0.26961
25-P-509A/B	Atmospheric Gas Oil Product Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	57.5	0.00	133.49	0.22 - 400.00	18.54	133.49	0.01	0.00238
25-P-510A/B	Distillate Pumparound Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	53.5	0.00	36.67	0.02 - 50.00	18.54	36.67	0.01	0.00081
25-P-521A/B	HVGO Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	59.7	0.00	19.49	0.13 - 58.10	18.54	19.49	0.01	0.00038
25-P-522A/B	Vacuum Diesel Product Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	55.9	0.00	0.50	0.01 - 0.50	18.54	0.50	0.01	0.00001
25-P-525A/B	Naphtha Splitter Overhead Reflux Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	41.7	0.00	37600.00	340.00 - 39500.00	18.54	37600.10	0.01	0.48550
25-P-526A/B	Stabilizer Charge Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	39.6	0.00	28666.67	82.70 - 27000.00	18.54	28666.74	0.01	0.32680
25-P-527A/B	Stabilizer Overhead Reflux Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	28.7	0.00	2746.00	1.25 - 5680.00	18.54	2746.01	0.01	0.02442
25-P-528A/B	Naphtha Splitter Bottoms Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	48.3	0.00	9498.67	92.10 - 9890.00	18.54	9498.69	0.01	0.13621
25-P-531A/B	Vacuum Residue Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	59.8	0.00	0.50	0.50 - 0.50	18.54	0.50	0.01	0.00001
25-P-534A/B	Desalter Booster Pumps	Process Wastewater	Uncontrolled	Process Sewer	0	100	54.3	0.00	1366.67	25.00 - 1400.00	18.54	1366.67	0.01	0.02299
Samples	Burner Fuel Sample Purges	Sample	Uncontrolled	Process Sewer	0	100	53.5	0.00	100.00	0.30 - 100.00	0.66	100.00	0.00	0.00006
Samples	Distillate Sample Purges	Sample	Uncontrolled	Process Sewer	0	100	53.5	0.00	100.00	0.30 - 100.00	0.66	100.00	0.00	0.00006
Samples	Naphtha/Splitter Charge Sample Purges	Sample	Uncontrolled	Process Sewer	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.33	5529.76	0.00	0.00139
Samples	Naphtha/Splitter Bottoms Sample Purges	Sample	Uncontrolled	Process Sewer	0	100	46.3	0.00	9498.67	92.10 - 9890.00	0.33	9498.69	0.00	0.00243
Samples	Vacuum Bottom Sample Purges	Sample	Uncontrolled	55 gallon barrel	0	100	55.9	0.00	0.50	0.01 - 0.50	0.33	0.50	0.00	0.00000
Vec Trucks	Vacuum Truck Information	Other	Uncontrolled	Slop Tanks	95	5	50.7	11.58	5525.00	9.30 - 6000.00	10.66	237.55	0.01	0.00262
25-D-0718	Gas/Ring Liquid Separator	Sour Water	Controlled	Sour Water Stripper	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
25-D-703	Crude Overhead Receiver	Sour Water	Controlled	Sour Water Stripper	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
25-D-709	Naphtha Splitter Overhead Receiver	Sour Water	Controlled	Sour Water Stripper	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
25-D-714	LSR Stabilizer Overhead Receiver	Sour Water	Controlled	Sour Water Stripper	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000

TAB
(Mg/yr)

6.07025

TABLE A.4.0. SOUR WATER STRIPPER - UNIT 26 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Steam Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
26-T-0102	Sour Water Stripper Tower	Process Wastewater	Uncontrolled	SWS Effluent to Crude Unit's Seal Drum to Process Sewer	100	0	0.0	0.20	0.00	0.0005 - 4.83	196450.33	0.20	103.00	0.04098
26-D-0721	Stripper Overhead Accumulator	Sour Water	Controlled	Bottoms to Degassing Drum (26-D-101)	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
TAB (Mg/yr)														
0.04098														

TABLE A.5.0. DISTILLATE HYDROTREATER - UNIT 32 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
32-D-0014	Salt Dryer (North)	Process Wastewater	Uncontrolled	Process Sewer	99	1	53.2	0.02	41.00	0.01 - 47.00	5307.97	0.37	2.78	0.00207
32-D-0017	Salt Dryer (South)	Process Wastewater	Uncontrolled	Process Sewer	99	1	53.2	0.02	41.00	0.01 - 47.00	5307.97	0.37	2.78	0.00207
32-FL-406	Feed Filter	Process Wastewater	Uncontrolled	Vac Truck to Slop Tank	0	100	50.7	0.00	61.67	41.00 - 100.00	18.86	61.67	0.01	0.00098
Sample	Salt Tower Sample Purge	Sample	Uncontrolled	Process Sewer	0	100	53.2	0.00	41.00	0.01 - 47.00	1.98	41.00	0.00	0.00007
Sample	Unifiner Stripper Bottoms Sample Purge	Sample	Uncontrolled	Process Sewer	0	100	53.2	0.00	41.00	0.01 - 47.00	31.79	41.00	0.02	0.00116
32-D-11	High Pressure Separator	Sour Water	Controlled	SWS	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
32-D-6	Low Pressure Separator	Sour Water	Controlled	SWS	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
32-D-5	Stripper Receiver	Sour Water	Controlled	SWS	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
32-D-015	Fuel Gas Coalescer	Sour Water	Controlled	SWS	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000

TAB
(Mg/yr)

0.00635

**TABLE A.6.0. SCANFINING/NAPHTHA HYDROTREATER - UNIT 20 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft ³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
20-T-602	Amine Scrubber	Process Wastewater	Uncontrolled	Vacuum Truck	100	0	0.0	0.01	0.00	0.01 - 1.00	48.01	0.01	0.03	0.00000
20-F-0300A	Hydrocarbon Basket Strainer	Process Wastewater	Uncontrolled	HC Drain	88	12	44.9	36.71	7817.22	13.50 - 16500.00	0.31	731.50	0.00	0.00022
20-F-0300B	Hydrocarbon Basket Strainer	Process Wastewater	Uncontrolled	HC Drain	88	12	44.9	36.71	7817.22	13.50 - 16500.00	0.31	731.50	0.00	0.00022
NA	Merox Catalyst Addition Pot	Process Wastewater	Uncontrolled	Process Sewer	95	5	44.9	36.71	7817.22	13.50 - 16500.00	1.89	320.43	0.00	0.00062
20-F-301A	Feed Filters	Process Wastewater	Controlled	Flare System	0	100	46.7	0.00	5247.50	81.00 - 9000.00	1.16	5247.51	0.00	0.00475
20-F-301B	Feed Filters	Process Wastewater	Controlled	Flare System	0	100	46.7	0.00	5247.50	81.00 - 9000.00	1.16	5247.51	0.00	0.00475
20-D-702	Reactor Product Separator	Process Wastewater	Uncontrolled	Process Sewer	100	0	0.0	209.00	0.00	41.00 - 97000.00	6.62	209.00	0.00	0.00144
Sample	Stripper Bottoms	Sample	Uncontrolled	Process Sewer	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.66	7817.24	0.00	0.00388
Sample	Run Down	Sample	Uncontrolled	Process Sewer	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.66	7817.24	0.00	0.00388
20-D-703	Stripper Reflux Drum	Sour Water	Controlled	Sour Water Header	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000

TAB
(Mg/yr)

0.01978

TABLE A.7.0. FLUID CATALYTIC CRACKING - UNIT 34 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
34-FL-110	Fuel Gas Coalescer	Process Wastewater	Uncontrolled	Process Sewer	95	5	45.3	2.85	285.00	2.50 - 320.00	15.89	13.23	0.01	0.00022
34-FL-0102	1st Stage Oil Reclaimer Filter	Process Wastewater	Uncontrolled	Process Sewer	0	100	56.4	0.00	2.54	0.09 - 8.10	0.66	2.54	0.00	0.00000
34-FL-0103	2nd Stage Oil Reclaimer Filter	Process Wastewater	Uncontrolled	Process Sewer	0	100	56.4	0.00	2.54	0.09 - 8.10	0.66	2.54	0.00	0.00000
Tank 23	Charge Tank 23 (Coker Gas Oil)	Tank Water Draw	Uncontrolled	Process Sewer	10	90	51.2	0.84	84.33	0.46 - 110.00	48.01	74.38	0.03	0.00312
34-P-111	Slurry Bottoms Pump	Process Wastewater	Uncontrolled	Process Sewer	0	100	64.7	0.00	60.44	0.02 - 162.00	47.68	60.44	0.03	0.00312
34-P-184	Slurry Pump to Steam Generator	Process Wastewater	Uncontrolled	Process Sewer	0	100	64.7	0.00	60.44	0.02 - 162.00	47.68	60.44	0.03	0.00312
34-P-189	Slurry Pump to Steam Generator	Process Wastewater	Uncontrolled	Process Sewer	0	100	64.7	0.00	60.44	0.02 - 162.00	47.68	60.44	0.03	0.00312
34-P-216	Slurry Pump to Storage	Process Wastewater	Uncontrolled	Process Sewer	0	100	64.7	0.00	60.44	0.02 - 162.00	47.68	60.44	0.03	0.00312
Sample	Ph Check of Overhead Receiver Water Boot	Sample	Uncontrolled	Process Sewer	100	0	0.0	92.06	0.00	12.70 - 24000.00	0.25	92.06	0.00	0.00002
Sample	FCC Combined Feed	Sample	Uncontrolled	Process Sewer	0	100	56.2	0.00	19.83	0.01 - 82.50	0.14	19.83	0.00	0.00000
Sample	FCC Slurry	Sample	Uncontrolled	Process Sewer	0	100	64.7	0.00	60.44	0.02 - 162.00	0.66	60.44	0.00	0.00004
Sample	FCC LCO	Sample	Uncontrolled	Process Sewer	0	100	57.4	0.00	85.60	0.05 - 355.00	1.32	85.60	0.00	0.00011
34-D-098	Overhead Receiver	Sour Water	Controlled	Sour Water Treater	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
TAB (Mg/yr)														0.01598

TABLE A.8.0. HYDROBON - UNIT 27 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
Sample	Sulfur Sorber Sample Purge	Sample	Uncontrolled	Process Sewer	100	0	0.0	61.00	0.00	61.00 - 9000.00	0.01	61.00	0.00	0.00000
Sample	Change Sample Purge	Sample	Uncontrolled	Process Sewer	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.14	5247.51	0.00	0.00058
Sample NA	Debutanizer Bottoms Sample Purge	Sample	Uncontrolled	Process Sewer	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.33	10291.70	0.00	0.00252
27-D-106	Miscellaneous Vac Truck Movements	Other	Uncontrolled	Tank 64	50	50	50.8	7.08	14750.00	0.12 - 25000.00	2.17	6611.67	0.00	0.01357
27-D-109	Hydrobon Product Separator Water Boot	Sour Water	Controlled	26-D-101 Degassing Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
	Debutanizer Receiver Water Boot	Sour Water	Controlled	Sour Water Stripper (26-T-101)	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
<u>TAB (Mg/yr)</u>														0.01668

TABLE A.9.0. PLATFORMER - UNIT 31 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lb/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mp/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
31-D-119	High Pressure Separator	Process Wastewater	Uncontrolled	Frac tank	99	1	45.3	3.68	133.00	0.17 - 133.00	144.95	4.62	0.08	0.00070
Other	Misc Vacuum Truck Waste	Other	Controlled	Vac Truck	50	50	50.6	7.08	14750.00	0.12 - 25000.00	2.10	6611.67	0.00	0.01310
TAB (Mg/yr)														
0.01379														

TABLE A.10.0. AMINE TREATER - UNIT 24 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/ Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
24-D-0004	Rich Amine Flash Drum	Slop Oil	Controlled	Tank 64	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	1569.50	1140.00	0.82	1.51155
24-D-0005	Reflux Accumulator	Sour Water	Controlled	28-D-101 Degassing Drum	100	0	0.00	0.00	0.00 - 0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
<u>TAB (Mg/yr)</u>														
1.51155														

TABLE A.11.0. GAS CONCENTRATION - UNIT 28 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmv)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmv)	Flow (gpm)	Total Annual Benzene (Mg/yr)
28-D-075	Fuel Gas Knock-Out Pot	Sour Water	Controlled	SWS System	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
28-D-69	Stripper Charge Drum	Sour Water	Controlled	SWS System	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
28-D-0072	Debutanizer Receiver	Sour Water	Controlled	Sour Water Stripper (28-T-101)	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000

TAB
(Mg/yr)

0.00000

TABLE A.12.0. ALKYLATION MEROX - UNIT 35 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft ³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
Sample	ASO Scrubber Sample Purge	Sample	Uncontrolled	Process Sewer	0	100	62.0	0.00	0.46	0.39 - 0.50	0.07	0.46	0.00	0.00000
35-D-27	Fuel Gas KO Pot	Sour Water	Controlled	SWS System	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
35-D-1	Caustic Prewash Scrubber	Spent Caustic	Uncontrolled	V-8, V-9	0	100	64.2	0.00	11.79	0.10 - 20.00	0.00	11.79	0.00	0.00000
														TAB (Mg/yr) 0.00000

**TABLE A.13.0. BUTAMER - UNIT 37 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft ³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
37-D-11	Butane Coalescer	Sour Water	Controlled	Fuel Gas Drain to Sour Water Degassing Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
37-D-12	Dryers Regeneration Coalescer	Sour Water	Controlled	Fuel Gas Drain to Sour Water Degassing Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
37-D-0015	Dryers Regeneration Coalescer	Sour Water	Controlled	Fuel Gas Drain to Sour Water Degassing Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
37-D-014	Fuel Gas Knock-out Pot	Sour Water	Controlled	Fuel Gas Drain to Sour Water Degassing Drum	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
TAB (Mg/yr)														0.00000

TABLE A.14.0. NEW AMINE - UNIT 21 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
21-D-2111	DEA Contactor KO Drum	Process Wastewater	Uncontrolled	NA	100	0	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
21-D-2122	Rich Amine Flash Drum	Process Wastewater	Uncontrolled	NA	0	100	0.0	0.00	0.00	0.00 - 0.00	0.00	0.00	0.00	0.00000
TAB (Mg/yr)														
0.00000														

TABLE A.15.0. #3 SULFUR RECOVERY UNIT - UNIT 23 PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft ³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
Based on operator interviews no benzene is expected in this unit														TAB (Mg/yr)
														0.00000

TABLE A.16.0. STORAGE AND HANDLING PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
TK-15	Ultra Low Sulfur Diesel	Tank Water Draw	Uncontrolled	Process Sewer	95	5	53.4	0.82	61.67	0.41 - 100.00	198.68	3.25	0.10	0.00067
TK-16	Ultra Low Sulfur Diesel	Tank Water Draw	Uncontrolled	Process Sewer	95	5	53.4	0.82	61.67	0.41 - 100.00	198.68	3.25	0.10	0.00067
TK-17	Light Cycle Oil	Tank Water Draw	Uncontrolled	Process Sewer	95	5	57.4	0.86	85.80	0.05 - 355.00	2781.46	4.77	1.46	0.01379
TK-20	Gas Oil (HVGO)	Tank Water Draw	Uncontrolled	Process Sewer	95	5	57.5	0.19	19.49	0.12 - 58.18	55.83	1.09	0.03	0.00006
TK-21	Gas Oil (HVGO)	Tank Water Draw	Uncontrolled	Process Sewer	95	5	57.5	0.19	19.49	0.12 - 58.18	55.83	1.09	0.03	0.00006
TK-22	Distillate	Tank Water Draw	Uncontrolled	Process Sewer	95	5	53.5	0.02	38.87	0.02 - 50.00	2781.46	1.60	1.46	0.00462
TK-23	Coker Gas Oil	Tank Water Draw	Uncontrolled	Vacuum Truck to Wastewater	95	5	59.7	0.20	52.00	0.11 - 63.00	205.75	2.68	0.11	0.00057
TK-28	Gas Oil	Tank Water Draw	Uncontrolled	Vacuum Truck	95	5	54.7	2.44	281.30	0.05 - 460.00	7.82	14.74	0.00	0.00012
TK-34	Platformer Reformate	Tank Water Draw	Uncontrolled	Process Sewer	95	5	50.1	57.78	12384.00	7.99 - 39000.00	238.41	556.82	0.13	0.13704
TK-35	Alkylate	Tank Water Draw	Uncontrolled	Process Sewer	90	10	43.2	1.03	53.25	0.70 - 76.50	59.60	4.76	0.03	0.00029
TK-36	Recovered Oil	Tank Water Draw	Uncontrolled	Vacuum Truck to Offsite	95	5	50.7	11.58	5525.00	9.30 - 6000.00	32.01	237.55	0.02	0.00785
TK-60	Toluene	Tank Water Draw	Uncontrolled	Process Sewer	90	10	53.7	.50	500.00	5.00 - 500.00	9.27	48.17	0.00	0.00046
TK-61	Sweet Naphtha	Tank Water Draw	Uncontrolled	Process Sewer	90	10	45.5	73.49	5529.75	2.65 - 12100.00	27.81	482.34	0.01	0.01381
TK-62	Distillate	Tank Water Draw	Uncontrolled	Process Sewer	95	5	53.5	0.90	100.00	0.30 - 100.00	2781.46	4.80	1.46	0.01325
TK-63	Heavy Straight Run	Tank Water Draw	Uncontrolled	Process Sewer	95	5	48.1	59.33	5933.33	56.00 - 6500.00	27.81	288.40	0.01	0.00827
TK-67	Naphtha	Tank Water Draw	Uncontrolled	Process Sewer	95	5	45.5	73.49	5529.75	2.65 - 12100.00	27.81	275.10	0.01	0.00787
TK-70	Sub-Octane Unleaded Gasoline	Tank Water Draw	Uncontrolled	Sump (Vacuum Truck) to Wastewater	95	5	44.9	36.71	7817.22	13.50 - 16500.00	37.09	320.43	0.02	0.01222
TK-71	Premium Unleaded Gasoline	Tank Water Draw	Uncontrolled	Sump (Vacuum Truck) to Wastewater	95	5	48.6	147.50	14750.00	80.00 - 25000.00	37.09	721.95	0.02	0.02761
TK-72	Crude	Tank Water Draw	Uncontrolled	Process Sewer	90	10	54.3	29.00	1386.87	25.00 - 1400.00	45.72	146.93	0.02	0.00691
TK-73	Crude	Tank Water Draw	Uncontrolled	Process Sewer	90	10	54.3	29.00	1386.87	25.00 - 1400.00	45.72	146.93	0.02	0.00691
TK-74	Crude Condensate	Tank Water Draw	Uncontrolled	Sump -Vacuum Truck to Wastewater	95	5	59.7	0.19	19.49	0.13 - 58.10	48.77	1.12	0.03	0.00008
TK-100	LSR	Tank Water Draw	Uncontrolled	Vacuum Truck to Wastewater	95	5	40.4	196.88	18688.00	13.00 - 39700.00	27.43	839.78	0.01	0.02360
TK-101	Diesel	Tank Water Draw	Uncontrolled	Sump (Vacuum Truck) to Wastewater	95	5	53.4	0.42	42.00	0.42 - 42.00	92.72	2.21	0.05	0.00021
TK-102	Unleaded Gasoline	Tank Water Draw	Uncontrolled	Sump (Vacuum Truck) to Wastewater	95	5	44.9	36.71	7817.22	13.50 - 16500.00	37.09	320.43	0.02	0.01222
TK-104	FCCU Gasoline	Tank Water Draw	Uncontrolled	Vacuum Truck to Stop oil or Bundle Slab to Wastewater	95	5	45.7	69.12	6873.64	14.00 - 12100.00	26.82	321.89	0.01	0.00888
TK-105	Coker Gas Oil	Tank Water Draw	Uncontrolled	Vacuum Truck to Wastewater	95	5	54.7	0.20	52.00	0.11 - 63.00	121.93	2.49	0.06	0.00031

TAB
(Mg/yr)
0.30811

**TABLE A.17.0. LABORATORY PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft ³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
Coker Charge	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	59.7	0.00	19.49	0.13 - 58.10	0.05	19.49	0.000	0.00000
Coker Naphtha	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.99	5529.76	0.001	0.00417
Coker Distillate	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.5	0.00	38.87	0.02 - 50.00	0.99	38.87	0.001	0.00003
Coker Gas Oil	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	51.2	0.00	84.33	0.46 - 110.00	0.33	84.33	0.000	0.00002
Crude Desalter In	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	54.3	0.00	1386.67	25.00 - 1400.00	0.33	1386.67	0.000	0.00041
Crude Desalter Out	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	54.3	0.00	1386.67	25.00 - 1400.00	0.33	1386.67	0.000	0.00041
Naphtha Splitter Charge	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.66	5529.76	0.000	0.00278
LSR Gasoline (Minalk In)	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	40.4	0.00	19888.00	13.00 - 39700.00	0.33	19888.05	0.000	0.00440
LSR Gasoline (Minalk Out)	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	40.4	0.00	19888.00	13.00 - 39700.00	0.66	19888.05	0.000	0.00881
HSR	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	48.1	0.00	6138.33	0.63 - 9800.00	0.66	6138.35	0.000	0.00327
Distillate	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.5	0.00	38.87	0.02 - 50.00	0.66	38.87	0.000	0.00002
Burner	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.5	0.00	38.87	0.02 - 50.00	0.66	38.87	0.000	0.00002
Vacuum Diesel	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	55.9	0.00	0.50	0.01 - 0.50	0.66	0.50	0.000	0.00000
LVGO	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.9	0.00	140.00	5.01 - 387.00	0.05	140.00	0.000	0.00001
HVGO	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	58.4	0.00	2.54	0.09 - 8.10	0.05	2.54	0.000	0.00000
Vacuum Tower Bottoms	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	59.7	0.00	19.49	0.13 - 58.10	1.99	19.49	0.001	0.00004
Stabilizer OH Liquid	Process Wastewater	Uncontrolled	Laboratory Tank	100	0	0.0	27.48	0.00	1.25 - 5680.00	0.09	27.48	0.000	0.00000
Desalter Water	Process Wastewater	Uncontrolled	Laboratory Tank	100	0	0.0	29.00	0.00	25.00 - 1400.00	0.33	29.00	0.000	0.00001
NHT Charge	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.14	5247.51	0.000	0.00058
NHT Debut Reflux	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.09	10291.70	0.000	0.00072
Reformer Feed	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.66	18820.88	0.000	0.00943
Reformate	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	50.1	0.00	12364.00	7.99 - 38000.00	0.86	12364.03	0.000	0.00685
Reformer Stab Reflux	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	51.4	0.00	66.00	0.01 - 473.00	0.05	66.00	0.000	0.00000
DHDS Feed	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.6	0.00	44.84	0.20 - 63.40	0.33	44.84	0.000	0.00001
DHDS Stripped Bottoms	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	58.1	0.00	1.32	0.25 - 3.50	0.66	1.32	0.000	0.00000
DHDS Stripper Ovh Liquid	Process Wastewater	Uncontrolled	Laboratory Tank	100	0	0.0	0.002	0.00	0.0005 - 3.30	0.09	0.00	0.000	0.00000
Amine III Rich Amine	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	63.0	0.00	5566.67	16.30 - 7400.00	0.05	5566.68	0.000	0.00028
Amine IV Rich Amine	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	63.0	0.00	5566.67	16.30 - 7400.00	0.05	5566.68	0.000	0.00028
Amine IV Wash Water	Process Wastewater	Uncontrolled	Laboratory Tank	100	0	0.0	3.81	0.00	0.04 - 9.56	0.05	3.81	0.000	0.00000
SWS Charge	Process Wastewater	Uncontrolled	Laboratory Tank	100	0	0.0	18.27	0.00	0.28 - 28.00	0.09	18.27	0.000	0.00000
Stripped Sour Water	Process Wastewater	Uncontrolled	Laboratory Tank	100	0	0.0	0.20	0.00	0.0005 - 4.83	0.14	0.20	0.000	0.00000
Rich MDEA	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	63.0	0.00	5566.67	16.30 - 7400.00	0.05	5566.68	0.000	0.00028
FCC Feed	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	57.2	0.00	6.75	0.50 - 28.00	0.14	6.75	0.000	0.00000
LCO	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	57.4	0.00	85.80	0.05 - 355.00	0.66	85.80	0.000	0.00005
Slurry	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	84.7	0.00	60.44	0.02 - 162.00	0.33	60.44	0.000	0.00002
Alkylate	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	43.2	0.00	53.25	0.70 - 76.50	0.66	53.25	0.000	0.00003
Alky Merox Caustic	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	64.2	0.00	11.79	0.10 - 20.00	0.33	11.79	0.000	0.00000
Gas Con Debut Reflux	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	68.6	0.00	1.00	0.01 - 1.00	0.33	1.00	0.000	0.00000
SCANfiner Charge	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.66	5247.51	0.000	0.00271
SCANfiner Strip Btms	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.66	10291.70	0.000	0.00504
SCANfiner Rundown	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.66	5529.76	0.000	0.00278
Tank 72	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	54.3	0.00	1386.67	25.00 - 1400.00	0.33	1386.67	0.000	0.00041
Tank 74	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	59.7	0.00	19.49	0.13 - 58.10	0.33	19.49	0.000	0.00001
Tank 75	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	54.3	0.00	1386.67	25.00 - 1400.00	0.33	1386.67	0.000	0.00041
DHDS Rundown (Oct - March)	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.2	0.00	1.67	0.0005 - 3.30	0.17	1.67	0.000	0.00000
Pipeline Crude Tender	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	54.3	0.00	1386.67	25.00 - 1400.00	0.33	1386.67	0.000	0.00041
Gasline Blend Line Sample	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.43	7817.24	0.000	0.00249
Finished Gasoline Composite	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.43	7817.24	0.000	0.00249

TABLE A-17.0. LABORATORY PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Flow (gpm)	Total Annual Benzene (Mg/yr)
Finished Gasoline Upper	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.43	7817.24	0.000	0.00249
Finished Gasoline Middle	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.43	7817.24	0.000	0.00249
Finished Gasoline Lower	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.43	7817.24	0.000	0.00249
Finished Diesel Tank	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.4	0.00	42.00	0.42 - 42.00	0.33	42.00	0.000	0.00001
Finished Diesel Upper	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.4	0.00	42.00	42.00 - 42.00	0.33	42.00	0.000	0.00001
Finished Diesel Middle	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.4	0.00	42.00	42.00 - 42.00	0.33	42.00	0.000	0.00001
Finished Diesel Lower	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.4	0.00	42.00	42.00 - 42.00	0.33	42.00	0.000	0.00001
Alkylate	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	43.2	0.00	53.25	0.70 - 78.50	0.14	53.25	0.000	0.00001
Reformate	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	50.1	0.00	12364.00	7.99 - 39000.00	0.09	12364.03	0.000	0.00098
SCANfiner/LSR	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	40.4	0.00	19688.00	13.00 - 39700.00	0.09	19688.05	0.000	0.00128
Tank 61 Sweet Naphtha	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	45.5	0.00	5528.75	2.65 - 12100.00	0.09	5529.76	0.000	0.00040
Weekly Railcar Slurry	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	64.7	0.00	60.44	0.02 - 162.00	0.05	60.44	0.000	0.00000
Tank 52 - PG 58-28	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	55.9	0.00	0.50	0.01 - 0.50	0.05	0.50	0.000	0.00000
Tank 93 - PG58-28	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	55.9	0.00	0.50	0.01 - 0.50	0.09	0.50	0.000	0.00000
Tank 94 - PG 64-22	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	55.8	0.00	0.50	0.01 - 0.50	0.09	0.50	0.000	0.00000
Tank 95 - PG58-28	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	55.9	0.00	0.50	0.01 - 0.50	0.09	0.50	0.000	0.00000
Tank 55 - PG 58-28	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	55.8	0.00	0.50	0.01 - 0.50	0.05	0.50	0.000	0.00000
EMC Raw Subgrade	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.33	1366.67	0.000	0.00041
EMC Oxygenated	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.33	1366.67	0.000	0.00041
Rocky Mountain Exchange	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.01	1366.67	0.000	0.00001
ASTM ILCP Gasoline	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.01	7817.24	0.000	0.00006
ASTM ILCP Diesel	Process Wastewater	Uncontrolled	Laboratory Tank	0	100	53.4	0.00	210.13	0.05 - 940.00	0.01	210.13	0.000	0.00000

TAB
(Mg/yr)

0.07081

TABLE A.18.0. SPILLS AND MISCELLANEOUS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

POG Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
SPILLS													
Cooling Tower #3 and #6	Spill	Uncontrolled	Ground	100	0	0.0	0.01	0.00	0.009 - 0.01	95364.24	0.01	50.00	0.00000
Diesel Loading	Spill	Uncontrolled	Ground	0	100	53.4	2.52	210.13	0.05 - 940.00	28609.27	210.13	15.00	0.00001
Crude Loading	Spill	Uncontrolled	Ground	0	100	59.7	0.00	0.19	0.13 - 0.31	160211.92	0.19	84.00	0.00000
MOSC Tank	Spill	Uncontrolled	Ground	10	90	66.8	35.70	87.29	35.70 - 87.29	38145.70	82.44	20.00	0.00001
MOSC Loading	Spill	Uncontrolled	Ground	10	90	66.8	35.70	87.29	35.70 - 87.29	1907.28	82.44	1.00	0.00000
Tank 72 Slurry	Spill	Uncontrolled	Ground	0	100	64.7	0.60	60.44	0.02 - 162.00	400529.80	60.44	210.00	0.00005
Cooling Tower #5	Spill	Uncontrolled	Ground	100	0	0.0	0.01	0.00	0.009 - 0.01	95364.24	0.01	50.00	0.00000
Tank 102 - Gasoline	Spill	Uncontrolled	Ground	0	100	44.9	36.71	7817.22	13.50 - 16500.00	19072.85	7817.24	10.00	0.00021
Truck Loading - Gasoline	Spill	Uncontrolled	Ground	0	100	44.9	36.71	7817.22	13.50 - 16500.00	152582.78	7817.24	80.00	0.00170
Tank 104 - Gasoline	Spill	Uncontrolled	Ground	0	100	44.9	36.71	7817.22	13.50 - 16500.00	28609.27	7817.24	15.00	0.00032
Tank 104 - Gasoline	Spill	Uncontrolled	Ground	0	100	44.9	36.71	7817.22	13.50 - 16500.00	19072.85	7817.24	10.00	0.00021
Tank 100 - Gasoline	Spill	Uncontrolled	Ground	0	100	44.9	36.71	7817.22	13.50 - 16500.00	28609.27	7817.24	15.00	0.00032
Tank 41 - Slop Oil	Spill	Uncontrolled	Ground	0	100	55.6	37.41	1989.04	37.41 - 1989.04	1907.28	1989.05	1.00	0.00001
Tank 64 - Gas Oil	Spill	Uncontrolled	Ground	0	100	53.9	1.40	140.00	5.01 - 387.00	1907.28	140.00	1.00	0.00000
Tank 22 - Gas Oil	Spill	Uncontrolled	Ground	0	100	53.9	1.40	140.00	5.01 - 387.00	9536.42	140.00	5.00	0.00000
FCCU Feed Slurry Line	Spill	Uncontrolled	Ground	0	100	84.7	0.60	60.44	0.02 - 162.00	95364.24	60.44	50.00	0.00001
Tank 56 Sour Water	Spill	Uncontrolled	Ground	100	0	0.0	18.27	0.00	0.28 - 28.00	95364.24	18.27	50.00	0.00000
Coker Sour Water Line	Spill	Uncontrolled	Ground	100	0	0.0	18.27	0.00	0.28 - 28.00	95364.24	18.27	50.00	0.00000
Groundwater Frac Tank	Spill	Uncontrolled	Ground	100	0	50.7	44.00	86.00	44.00 - 66.00	114437.09	44.00	60.00	0.00001
Wastewater Sludge	Spill	Uncontrolled	Ground	50	50	66.8	35.70	87.29	35.70 - 87.29	80105.96	62.38	42.00	0.00001
Tank 58 Sour Water	Spill	Uncontrolled	Ground	100	0	0.0	18.27	0.00	0.28 - 28.00	320423.84	18.27	168.00	0.00001
Slurry Rail Car	Spill	Uncontrolled	Ground	0	100	64.7	0.60	60.44	0.02 - 162.00	152582.78	60.44	80.00	0.00002
DAF Line	Spill	Uncontrolled	Ground	50	50	66.8	35.70	87.29	35.70 - 87.29	9538.42	62.38	5.00	0.00000
FCCU Wet Gas Compressor	Spill	Uncontrolled	Ground	10	80	44.0	92.06	9206.00	12.70 - 24000.00	19072.85	7985.18	10.00	0.00022
API Separator	Spill	Uncontrolled	Ground	50	50	55.6	37.41	1989.04	37.41 - 1989.04	3051655.63	956.99	1600.00	0.00548
Tank 2 Sour Water	Spill	Uncontrolled	Ground	100	0	0.0	18.27	0.00	0.28 - 28.00	381456.95	18.27	200.00	0.00001
MISCELLANEOUS WASTE STREAMS													
Flare Knockout Drum	Process Wastewater	Uncontrolled	Tank 64	80	20	48.6	15.88	2689.00	0.04 - 11800.00	1316.03	451.84	0.69	0.59257
Spent Caustic Shipped Offsite	Spent Caustic	Uncontrolled	Off site	0	100	58.0	0.00	479.30	0.005 - 2913.25	419.60	479.30	0.22	0.19486
Vacuum Truck Movements	Process Wastewater	Controlled	Tank 64	10	90	50.6	7.08	708.00	0.12 - 708.00	629.40	623.59	0.33	0.33977
Vacuum Truck Movements	Process Wastewater	Uncontrolled	WWTP API via bundle pad	90	10	50.6	6.15	1294.00	3.94 - 2100.00	419.60	112.67	0.22	0.04836
Vacuum Truck Movements	Other	Uncontrolled	MOSC prior to recycle	0	100	59.6	0.00	36.62	0.05 - 110.00	1640.26	36.82	0.86	0.06013

TAB
(Mg/yr)

1.24441

**TABLE A.19.0. SOLID WASTE SHIPPED OFF SITE
FRONTIER REFINING INC., CHEYENNE, WYOMING**

POG Description	Waste Stream Type	Controlled/ Uncontrolled	Benzene Concentration (ppmw)	Range of Benzene Concentrations (ppmw)	Amount (lbs)	Total Annual Benzene (Mg/yr)
Drain Sludge	Solid Waste	Uncontrolled	87.29	35.70 - 87.29	126880	0.00503
Slop Oil	Solid Waste	Uncontrolled	1989.04	37.41 - 1989.04	27378	0.02472
						TAB (Mg/yr)
						0.02975

**TABLE A.20.0. MAINTENANCE AND TURNAROUND SUMMARY
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Source	Table	Total Annual Benzene (Mg)
Coker - Unit 36	A.20.1	0.00129
Crude - Unit 25	A.20.2	0.00486
Sour Water Stripper - Unit 26	A.20.3	0.00034
Distillate Hydrotreater - Unit 32	A.20.4	0.00002
Scanfining/Naphtha Hydrotreater - Unit 20	A.20.5	0.00077
Fluid Catalytic Cracking - Unit 34	A.20.6	0.00030
Hydrobon - Unit 27	A.20.7	0.00125
Platformer - Unit 31	A.20.8	0.00369
Amine Treater - Unit 24	A.20.9	0.00010
Gas Concentration - Unit 28	A.20.10	0.00126
Alkylation Merox - Unit 35	A.20.11	0.00000
Butamer - Unit 37	A.20.12	0.00000
New Amine - Unit 34	A.20.13	0.00000
#3 Sulfur Recovery Unit - Unit 23	A.20.14	0.00000
Loading and Unloading - Unit 40	A.20.15	0.00090
Storage & Handling	A.20.16	0.00301
Total:		0.01781

TABLE A.20.1. COKER - UNIT 36 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
36-D-0724	Sour Water Surge Drum	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	18.27	0.00	0.28 - 28.00	0.07	18.27	20	0.00000
36-D-0729	Compressor Interstage KO Drum	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-D-0730	Compressor Suction Drum	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-D-405A	Suction Scrubber	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-D-405B	Suction Scrubber	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-D-407A	1st Stage Suction Scrubber	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-D-701	Fractionator Ovhd Receiver	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	46.5	14.50	1450.00	12.20 - 1780.00	0.07	627.37	20	0.00000
36-D-707	Coke Drum Condensate Drum	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	0.35	0.00	0.05 - 135.00	0.07	0.35	20	0.00000
36-D-708	Compressor Suction Drum	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-D-709	Coker Naphtha Surge Drum	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.8	0.00	1983.33	270.00 - 3100.00	0.07	1983.34	20	0.00000
36-D-710	High Pressure Receiver	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.8	0.00	139.00	0.50 - 240.00	0.07	139.00	20	0.00000
36-D-711	Stabilizer Overhead Receiver	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	46.4	216.67	2975.00	180.00 - 3200.00	0.07	1392.48	20	0.00000
36-D-712	Coker Fuel Gas KO Drum	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	0.14	0.00	0.06 - 17.00	0.07	0.14	20	0.00000
36-D-715	Flare Knockout Drum	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	0.62	0.00	0.15 - 750.00	0.07	0.62	20	0.00000
36-D-717	KO Drum	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-D-717	"Old Compressor" KO Drum	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-D-722	Flare Igniter Fuel Gas Knockout	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	0.14	0.00	0.06 - 17.00	0.07	0.14	20	0.00000
E-100	Condenser Heat Exchanger	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	0.35	0.00	0.05 - 135.00	0.07	0.35	20	0.00000
36-E-0805	Gas Oil Exchanger (Steam Generator)	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-E-806	Bell Feed Water/Gas Oil Exchanger	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-E-0807	Coker Gas Oil Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-E-0810	Stripper Feed/Stabilizer Bottoms	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.07	2975.01	20	0.00000
36-E-0812	Stabilizer Reboiler	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.07	2975.01	20	0.00000
36-E-0817A	Cold Charge/Gas Oil Exchanger	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-E-0817B	Cold Charge/Gas Oil Exchanger	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-E-0817B	Combined Charge/Gas Oil Exchanger	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-E-0818B	Combined Charge/Gas Oil Exchanger	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-E-0821A	Stabilizer Ovhd. Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.07	2975.01	20	0.00000
36-E-0821B	Stabilizer Ovhd. Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.07	2975.01	20	0.00000
36-E-0909	Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
36-E-0912	Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
36-E-0913	Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
36-E-0914	Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
36-E-0917A	Main Fractionator Overhead Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.5	0.00	1450.00	12.20 - 1790.00	0.07	1450.00	20	0.00000
36-E-0917B	Main Fractionator Overhead Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.5	0.00	1450.00	12.20 - 1790.00	0.07	1450.00	20	0.00000
36-E-0917C	Main Fractionator Overhead Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.5	0.00	1450.00	12.20 - 1790.00	0.07	1450.00	20	0.00000
36-E-0917D	Main Fractionator Overhead Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.5	0.00	1450.00	12.20 - 1790.00	0.07	1450.00	20	0.00000
36-E-0918A	Compressor Intercoolers	Maintenance/TA	Controlled	Coker API	0	0	100	46.8	0.00	510.00	5.10 - 510.00	0.07	510.00	20	0.00000
36-E-0918B	Compressor Intercoolers	Maintenance/TA	Controlled	Coker API	0	0	100	46.8	0.00	510.00	5.10 - 510.00	0.07	510.00	20	0.00000
36-E-0919	Stripper Side Reboiler	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	46.8	5.10	510.00	5.10 - 510.00	0.07	221.49	20	0.00000
36-E-0920	Distillate P/A Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
36-E-0921A	Distillate Product Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
36-E-0921B	Distillate Product Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
36-E-101A1	Blowdown Tower Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	57.6	1.52	320.00	0.22 - 320.00	0.07	154.38	20	0.00000
36-E-101A2	Blowdown Tower Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	57.6	1.52	320.00	0.22 - 320.00	0.07	154.38	20	0.00000
36-E-101B1	Blowdown Tower Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	57.6	1.52	320.00	0.22 - 320.00	0.07	154.38	20	0.00000
36-E-101B2	Blowdown Tower Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	57.6	1.52	320.00	0.22 - 320.00	0.07	154.38	20	0.00000

TABLE A.20.1. COKER - UNIT 36 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
36-E-801A	Overhead Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	59.6	0.35	35.00	0.05 - 135.00	0.07	17.28	20	0.00000
36-E-801B	Overhead Condenser	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	59.6	0.35	35.00	0.05 - 135.00	0.07	17.28	20	0.00000
36-E-803A	Gas Oil Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-E-803B	Distillate Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
36-E-811B	Stripper Reboiler	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	46.4	216.67	2975.00	180.00 - 3200.00	0.07	1392.48	20	0.00000
36-E-814A	Stabilizer Bottoms Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.07	2975.01	20	0.00000
36-E-814B	Stabilizer Bottoms Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.07	2975.01	20	0.00000
36-E-814C	Stabilizer Bottoms Cooler	Maintenance/TA	Controlled	Coker API	0	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.07	2975.01	20	0.00000
36-E-816	BFW/Naphtha Exchanger	Maintenance/TA	Controlled	Coker API	0	0	100	46.8	0.00	1983.33	270.00 - 3100.00	0.07	1983.34	20	0.00000
36-E-820A	Compressor After Cooler	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-E-820B	Compressor After Cooler	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-FL-0538	Basket Filter; post Tk1003; pre P-512	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	0.01	0.00	0.00 - 0.03	0.07	0.01	20	0.00000
36-FL-0542A	Gas Oil Reflux Strainer	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-FL-0542B	Gas Oil Reflux Strainer	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-FL-0801A	Wash Oil Strainer	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	0.30	0.125 - 0.65	0.07	0.30	20	0.00000
36-FL-0801B	Wash Oil Strainer	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	0.30	0.125 - 0.65	0.07	0.30	20	0.00000
36-FL-102A	Filter (Basket)	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	0.01	0.00	0.00 - 0.03	0.07	0.01	20	0.00000
36-FL-102B	Filter (Basket)	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	0.01	0.00	0.00 - 0.03	0.07	0.01	20	0.00000
36-FL-1427A	Quench Water Strainer	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	0.01	0.00	0.00 - 0.03	0.07	0.01	20	0.00000
36-FL-1427B	Quench Water Strainer	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	0.01	0.00	0.00 - 0.03	0.07	0.01	20	0.00000
36-FL-537A	Bottoms Screen	Maintenance/TA	Controlled	Coker API	0	0	100	59.7	0.00	0.19	0.13 - 0.31	0.07	0.19	20	0.00000
36-FL-537B	Bottoms Screen	Maintenance/TA	Controlled	Coker API	0	0	100	59.7	0.00	0.19	0.13 - 0.31	0.07	0.19	20	0.00000
36-FL-539A	Filter upstream from P-515A	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	0.01	0.00	0.00 - 0.03	0.07	0.01	20	0.00000
36-FL-539A	Condensate Screens for D-707	Maintenance/TA	Controlled	Coker API	0	0	100	53.9	0.00	19.37	18.00 - 20.80	0.07	19.37	20	0.00000
36-FL-539B	Filter upstream from P-515B	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	0.01	0.00	0.00 - 0.03	0.07	0.01	20	0.00000
36-FL-539B	Condensate Screens for D-707	Maintenance/TA	Controlled	Coker API	0	0	100	53.9	0.00	19.37	18.00 - 20.80	0.07	19.37	20	0.00000
36-H-1101A	Coker Heater "A"	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-H-1101B	Coker Heater "B"	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-H-1102	Coker Feed Preheater	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-P-0502A	Gas Oil Reflux Pump	Maintenance/TA	Controlled	Coker API	3	0	100	51.2	0.00	84.33	0.46 - 110.00	0.02	84.33	5	0.00000
36-P-0502B	Gas Oil Reflux Pump	Maintenance/TA	Controlled	Coker API	3	0	100	51.2	0.00	84.33	0.46 - 110.00	0.02	84.33	5	0.00000
36-P-0502C	Gas Oil Reflux Pump	Maintenance/TA	Controlled	Coker API	3	0	100	51.2	0.00	84.33	0.46 - 110.00	0.02	84.33	5	0.00000
36-P-0513A	Quench Water Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	0.01	0.00	0.00 - 0.03	0.02	0.01	5	0.00000
36-P-0513B	Quench Water Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	0.01	0.00	0.00 - 0.03	0.02	0.01	5	0.00000
36-P-0522	Settling Drum Pump	Maintenance/TA	Controlled	Coker API	3	50	50	57.6	1.52	320.00	0.22 - 320.00	0.02	154.38	5	0.00001
36-P-0545A	Compressor Suction KO Drum Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	5.10	0.00	5.10 - 510.00	0.02	5.10	5	0.00000
36-P-0545B	Compressor Suction KO Drum Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	5.10	0.00	5.10 - 510.00	0.02	5.10	5	0.00000
36-P-0625	Fractionator Bottoms Circ Pumps	Maintenance/TA	Controlled	Coker API	3	0	100	46.5	0.00	1450.00	12.20 - 1790.00	0.02	1450.00	5	0.00008
36-P-0629A	Stabilizer Product Pump	Maintenance/TA	Controlled	Flare KO Drum	3	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.02	2975.01	5	0.00013
36-P-0629B	Stabilizer Product Pump	Maintenance/TA	Controlled	Flare KO Drum	3	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.02	2975.01	5	0.00013
36-P-0631A	Compressor Interstage KO Drum Pump	Maintenance/TA	Controlled	Flare KO Drum	3	100	0	0.0	5.10	0.00	5.10 - 510.00	0.02	5.10	5	0.00000
36-P-0631B	Compressor Interstage KO Drum Pump	Maintenance/TA	Controlled	Flare KO Drum	3	100	0	0.0	5.10	0.00	5.10 - 510.00	0.02	5.10	5	0.00000
36-P-0632A	Fractionator OH Sour Water Pump	Maintenance/TA	Controlled	Flare KO Drum	3	100	0	0.0	1.39	0.00	0.50 - 240.00	0.02	1.39	5	0.00000
36-P-0632B	Fractionator OH Sour Water Pump	Maintenance/TA	Controlled	Flare KO Drum	3	100	0	0.0	1.39	0.00	0.50 - 240.00	0.02	1.39	5	0.00000
P-501A	Heater Charge Pump	Maintenance/TA	Controlled	Coker API	3	0	100	51.2	0.00	84.33	0.46 - 110.00	0.02	84.33	5	0.00000
P-501B	Heater Charge Pump	Maintenance/TA	Controlled	Coker API	3	0	100	51.2	0.00	84.33	0.46 - 110.00	0.02	84.33	5	0.00000

TABLE A.20.1. COKER - UNIT 36 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene In Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
36-P-503A	Distillate Product Pump	Maintenance/TA	Controlled	Coker API	3	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
36-P-503B	Distillate Product Pump	Maintenance/TA	Controlled	Coker API	3	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
36-P-504A	Sponge Oil Pump	Maintenance/TA	Controlled	Coker API	3	0	100	60.1	0.00	325.00	0.24 - 474.00	0.02	325.00	5	0.00002
36-P-504B	Sponge Oil Pump	Maintenance/TA	Controlled	Coker API	3	0	100	60.1	0.00	325.00	0.24 - 474.00	0.02	325.00	5	0.00002
36-P-505A	Fractionator Reflux Pump	Maintenance/TA	Controlled	Flare KO Drum	3	0	100	46.5	0.00	1450.00	12.20 - 1790.00	0.02	1450.00	5	0.00006
36-P-505B	Fractionator Reflux Pump	Maintenance/TA	Controlled	Flare KO Drum	3	0	100	46.5	0.00	1450.00	12.20 - 1790.00	0.02	1450.00	5	0.00006
36-P-507A	Stripper Charge Pump	Maintenance/TA	Controlled	Flare KO Drum	3	100	0	0.0	5.10	0.00	5.10 - 510.00	0.02	5.10	5	0.00000
36-P-507B	Stripper Charge Pump	Maintenance/TA	Controlled	Flare KO Drum	3	100	0	0.0	5.10	0.00	5.10 - 510.00	0.02	5.10	5	0.00000
36-P-508	Rich Oil Pump	Maintenance/TA	Controlled	Coker API	3	0	100	57.6	0.00	320.00	0.90 - 320.00	0.02	320.00	5	0.00002
36-P-509B	Common Spare Pump	Maintenance/TA	Controlled	Coker API	3	0	100	51.2	0.00	84.33	0.46 - 110.00	0.02	84.33	5	0.00000
36-P-510A	Stabilizer Reflux Pumps	Maintenance/TA	Controlled	Flare KO Drum	3	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.02	2975.01	5	0.00013
36-P-510B	Stabilizer Reflux Pumps	Maintenance/TA	Controlled	Flare KO Drum	3	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.02	2975.01	5	0.00013
36-P-512	Decoking Water Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	0.01	0.00	0.00 - 0.03	0.02	0.01	5	0.00000
36-P-514	Not Available	Maintenance/TA	Controlled	Coker API	3	0	100	51.2	0.00	84.33	0.46 - 110.00	0.02	84.33	5	0.00000
36-P-515A	Coke Drum Condensate Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	0.35	0.00	0.05 - 135.00	0.02	0.35	5	0.00000
36-P-515B	Coke Drum Condensate Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	0.35	0.00	0.05 - 135.00	0.02	0.35	5	0.00000
36-P-516A	Settling Basin Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	0.01	0.00	0.00 - 0.03	0.02	0.01	5	0.00000
36-P-516B	Settling Basin Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	0.01	0.00	0.00 - 0.03	0.02	0.01	5	0.00000
36-P-518A	Naphtha Pump	Maintenance/TA	Controlled	Flare KO Drum	3	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.02	5529.76	5	0.00023
36-P-518B	Naphtha Pump	Maintenance/TA	Controlled	Flare KO Drum	3	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.02	5529.76	5	0.00023
36-P-521A	Blowdown Tower Circulation	Maintenance/TA	Controlled	Flare KO Drum	2	50	50	57.6	1.52	320.00	0.22 - 320.00	0.02	154.38	5	0.00001
36-P-521-B	Blowdown Tower Circulation Pump New	Maintenance/TA	Controlled	Flare KO Drum	3	50	50	57.6	1.52	320.00	0.22 - 320.00	0.02	154.38	5	0.00001
36-P-524	Decoking Water Transfer	Maintenance/TA	Controlled	Coker API	3	50	50	57.6	1.52	320.00	0.22 - 320.00	0.02	154.38	5	0.00001
36-P-532A	Distillate Injection Pump	Maintenance/TA	Controlled	Coker API	3	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
36-P-532B	Distillate Injection Pump	Maintenance/TA	Controlled	Coker API	3	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
36-P-532C	Distillate Injection Pump	Maintenance/TA	Controlled	Coker API	3	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
36-P-533A	Gas Oil Product Pump	Maintenance/TA	Controlled	Coker API	3	0	100	51.2	0.00	84.33	0.46 - 110.00	0.02	84.33	5	0.00000
36-P-533B	Gas Oil Product Pump	Maintenance/TA	Controlled	Coker API	3	0	100	51.2	0.00	84.33	0.46 - 110.00	0.02	84.33	5	0.00000
36-P-535	Sludge Pump	Maintenance/TA	Controlled	Coker API	3	0	100	59.7	0.00	0.19	0.13 - 0.31	0.02	0.19	5	0.00000
36-P-536A	KO Drum Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	0.62	0.00	0.15 - 750.00	0.02	0.62	5	0.00000
36-P-536B	KO Drum Pump	Maintenance/TA	Controlled	Coker API	3	100	0	0.0	0.62	0.00	0.15 - 750.00	0.02	0.62	5	0.00000
36-P-537A	Distillate Pumparound Pump	Maintenance/TA	Controlled	Coker API	3	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
36-P-537B	Distillate Pumparound Pump	Maintenance/TA	Controlled	Coker API	3	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
36-P-539A	Blowdown Water Pump	Maintenance/TA	Controlled	Flare KO Drum	3	50	50	57.6	1.52	320.00	0.22 - 320	0.02	154.38	5	0.00001
36-P-539B	Blowdown Water Pump	Maintenance/TA	Controlled	Flare KO Drum	3	50	50	57.6	1.52	320.00	0.22 - 320	0.02	154.38	5	0.00001
36-P-541	Flare KO Pump	Maintenance/TA	Controlled	Flare KO Drum	3	100	0	0.0	0.62	0.00	0.15 - 750.00	0.02	0.62	5	0.00000
36-T-0801	Main Fractionator	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.5	0.00	1450.00	12.20 - 1790.00	0.07	1450.00	20	0.00000
36-T-602A	Distillate Stripper Tower	Maintenance/TA	Controlled	Coker API	0	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
36-T-602A/B	Gas Oil Stripper	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000
36-T-603	Primary/Secondary Absorber	Maintenance/TA	Controlled	Coker API	0	0	100	57.6	0.00	320.00	0.80 - 320.00	0.07	320.00	20	0.00000
36-T-604	Stripper	Maintenance/TA	Controlled	Flare KO Drum	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
36-T-605	Stabilizer	Maintenance/TA	Controlled	Flare KO Drum	0	0	100	46.4	0.00	2975.00	180.00 - 3200.00	0.07	2975.01	20	0.00000
36-T-606	Blowdown Tower	Maintenance/TA	Controlled	Flare KO Drum	0	50	50	57.6	1.52	320.00	0.22 - 320.00	0.07	154.38	20	0.00000
36-TK-1003	Surge Tank	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	0.01	0.00	0.00 - 0.03	0.07	0.01	20	0.00000
36-TK-1004	MOSC or Sludge	Maintenance/TA	Controlled	Coker API	0	0	100	51.2	0.00	84.33	0.46 - 110.00	0.07	84.33	20	0.00000

TABLE A.20.1. COKER - UNIT 36 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft ³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
D-100	Compressor KO Drum	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
D-200	Service Liquid Separator	Maintenance/TA	Controlled	Coker API	0	100	0	0.0	1.39	0.00	0.50 - 240.00	0.07	1.39	20	0.00000
#?	Strainer for TK-1004 effluent	Maintenance/TA	Controlled	Coker API	0	0	100	66.8	0.00	87.29	15.00 - 210.00	0.07	87.29	20	0.00000

TAB
(Mg/yr)

0.00128

TABLE A.20.2. CRUDE - UNIT 25 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene In Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
25-D-703	Crude Overhead Receiver	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	22000.00	69.00 - 22000.00	0.07	22000.06	20	0.00000
25-D-707	Vacuum Seal Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	57.5	0.00	133.49	0.22 - 400.00	0.07	133.49	20	0.00000
25-D-711	Off-Gas Knockout Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	22000.00	69.00 - 22000.00	0.07	22000.06	20	0.00000
25-D-0712	Desalter Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-D-713	Second Stage Comp. KO Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.0	5.10	0.00	5.10 - 510.00	0.07	5.10	20	0.00000
25-D-719	Fuel Gas Surge Pot	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	45.3	0.00	14.00	0.06 - 17.00	0.07	14.00	20	0.00000
25-E-0846	Ring Liquid Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.0	29.00	0.00	25.00 - 31.00	0.07	29.00	20	0.00000
25-E-801A	Naphtha Overhead / Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	41.7	0.00	37600.00	340.00 - 39500.00	0.07	37600.10	20	0.00000
25-E-801B	Naphtha Overhead / Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	41.7	0.00	37600.00	340.00 - 39500.00	0.07	37600.10	20	0.00000
25-E-801C	Naphtha Overhead / Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	41.7	0.00	37600.00	340.00 - 39500.00	0.07	37600.10	20	0.00000
25-E-801D	Naphtha Overhead / Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	41.7	0.00	37600.00	340.00 - 39500.00	0.07	37600.10	20	0.00000
25-E-802	Crude/Distillate Product	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-803	Distillate Product Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
25-E-804	Crude/Burner Product	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-805A	Burner Product Cooler (A)	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	50.5	0.00	214.88	0.40 - 640.00	0.07	214.88	20	0.00000
25-E-805B	Burner Product Cooler (B)	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	50.5	0.00	214.88	0.40 - 640.00	0.07	214.88	20	0.00000
25-E-806	LVGO Product Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	53.8	0.00	140.00	5.01 - 387.00	0.07	140.00	20	0.00000
25-E-807	Atm. Gas Oil / Desalted Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-808A	HVGO / Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-808B	HVGO / Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-808C	HVGO / Desalts Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-808D	HVGO / Desalts Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-808E	HVGO / Desalts Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-809	Naphtha Splitter Bottoms Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	48.3	0.00	9496.67	92.10 - 9890.00	0.07	9496.69	20	0.00000
25-E-811A	Crude / Distillate Pumparound	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-811B	Crude / Distillate Pumparound	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-812A	Crude Fractionator OVHD Cond.	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	22000.00	69.00 - 22000.00	0.07	22000.06	20	0.00000
25-E-812B	Crude Fractionator OVHD Cond.	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	22000.00	69.00 - 22000.00	0.07	22000.06	20	0.00000
25-E-812C	Crude Fractionator OVHD Cond.	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	22000.00	69.00 - 22000.00	0.07	22000.06	20	0.00000
25-E-812D	Crude Fractionator OVHD Cond.	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	22000.00	69.00 - 22000.00	0.07	22000.06	20	0.00000
25-E-813	LVGO Product / Desalted Crude	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-819A	Desalted Crude / Vacuum Residue	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-819B	Desalted Crude / Vacuum Residue	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-819C	Desalted Crude / Vacuum Residue	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-819D	Desalted Crude / Vacuum Residue	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-E-820A	Vacuum Diesel Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	57.5	0.00	133.49	0.22 - 400.00	0.07	133.49	20	0.00000
25-E-820B	Vacuum Diesel Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	57.5	0.00	133.49	0.22 - 400.00	0.07	133.49	20	0.00000
25-E-822	HVGO Product Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	59.7	0.00	19.49	0.13 - 58.10	0.07	19.49	20	0.00000
25-E-824	Vacuum OVHD Surface Condenser	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	57.5	0.00	133.49	0.22 - 400.00	0.07	133.49	20	0.00000
25-E-825	Vac OVHD Interstage Condenser	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	57.5	0.00	133.49	0.22 - 400.00	0.07	133.49	20	0.00000
25-E-826	Vacuum After Condenser	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	57.5	0.00	133.49	0.22 - 400.00	0.07	133.49	20	0.00000
25-E-830	Naph. Splitter Feed / Bottoms	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	48.3	0.00	9496.67	92.10 - 9890.00	0.07	9496.69	20	0.00000
25-E-831	Naph. Splitter Feed / Bottoms	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	48.3	0.00	9496.67	92.10 - 9890.00	0.07	9496.69	20	0.00000

**TABLE A.20.2. CRUDE - UNIT 25 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lb/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene In Waste (ppmw)	Total Benzene Volume (gallons)	Total Annual Benzene (Mg/yr)
25-E-832	Naphtha Splitter Reboiler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	46.3	0.00	9496.67	92.10 - 9890.00	0.07	9496.69	20	0.00000
25-E-833	Naphtha Splitter OVHD Condenser	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	41.7	0.00	37600.00	340.00 - 39500.00	0.07	37600.10	20	0.00000
25-E-834A	Naphtha Splitter Bottoms Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	46.3	0.00	9496.67	92.10 - 9890.00	0.07	9496.69	20	0.00000
25-E-834B	Naphtha Splitter Bottoms Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	46.3	0.00	9496.67	92.10 - 9890.00	0.07	9496.69	20	0.00000
25-E-835A	LSR Stabilizer Feed / Bottoms	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	36040.00	42.00 - 43000.00	0.07	36040.09	20	0.00000
25-E-835B	LSR Stabilizer Feed / Bottoms	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	36040.00	42.00 - 43000.00	0.07	36040.09	20	0.00000
25-E-836	LSR Stabilizer Bottoms Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	36040.00	42.00 - 43000.00	0.07	36040.09	20	0.00000
25-E-837	LSR Stabilizer Reboiler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	36040.00	42.00 - 43000.00	0.07	36040.09	20	0.00000
25-E-838	Stabilizer Overhead Condenser	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	39.6	0.00	36040.00	42.00 - 43000.00	0.07	36040.09	20	0.00000
25-E-841	Desalter Effluent/Cooling Water	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.0	29.00	0.00	25.00 - 31.00	0.07	29.00	20	0.00000
25-E-842	Desalter Effluent/Cooling Water	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.0	29.00	0.00	25.00 - 31.00	0.07	29.00	20	0.00000
25-E-844	Crude/VAC Diesel Pumparound	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00000
25-P-504A	AGO Pumparound Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	57.5	0.00	133.49	0.22 - 400.00	0.02	133.49	5	0.00000
25-P-504B	AGO Pumparound Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	57.5	0.00	133.49	0.22 - 400.00	0.02	133.49	5	0.00000
25-P-501A	Crude Charge Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.02	1366.67	5	0.00002
25-P-501B	Crude Charge Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.02	1366.67	5	0.00002
25-P-502A	Crude Heater Charge Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.02	1366.67	5	0.00002
25-P-502B	Crude Heater Charge Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.02	1366.67	5	0.00002
25-P-503A	Reduced Crude Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	0.19	0.13 - 0.31	0.02	0.19	5	0.00000
25-P-503B	Reduced Crude Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	0.19	0.13 - 0.31	0.02	0.19	5	0.00000
25-P-505	Burner Prod. Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.5	0.00	214.88	0.40 - 640.00	0.02	214.88	5	0.00000
25-P-506A	Distillate Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
25-P-506B	Distillate Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
25-P-507A	Crude Overhead Reflux Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	39.6	0.00	22000.00	69.00 - 22000.00	0.02	22000.06	5	0.00026
25-P-507B	Crude Overhead Reflux Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	39.6	0.00	22000.00	69.00 - 22000.00	0.02	22000.06	5	0.00026
25-P-508	Crude Overhead Reflux Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	39.6	0.00	22000.00	69.00 - 22000.00	0.02	22000.06	5	0.00026
25-P-509A	Atmospheric Gas Oil Product Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	57.5	0.00	133.49	0.22 - 400.00	0.02	133.49	5	0.00000
25-P-509B	Atmospheric Gas Oil Product Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	57.5	0.00	133.49	0.22 - 400.00	0.02	133.49	5	0.00000
25-P-510A	Distillate Pumparound Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
25-P-510B	Distillate Pumparound Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	0.02 - 50.00	0.02	36.67	5	0.00000
25-P-511A	Sour Water Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	100	0	0.0	18.27	0.00	0.28 - 28.00	0.02	18.27	5	0.00000
25-P-511B	Sour Water Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	100	0	0.0	18.27	0.00	0.28 - 28.00	0.02	18.27	5	0.00000
P-518	Compressor Suction Liquig KÖ Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	100	0	0.0	5.10	0.00	5.10 - 510.00	0.02	5.10	5	0.00000
25-P-519A	Desalter Feedwater Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	100	0	0.0	29.00	0.00	25.00 - 31.00	0.02	29.00	5	0.00000
25-P-519B	Desalter Feedwater Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	100	0	0.0	29.00	0.00	25.00 - 31.00	0.02	29.00	5	0.00000
25-P-0520	Vacuum Residue Pump (Spare)	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	0.19	0.13 - 0.31	0.02	0.19	5	0.00000
25-P-521A	HVGO Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	19.49	0.13 - 58.10	0.02	19.49	5	0.00000
25-P-521B	HVGO Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	19.49	0.13 - 58.10	0.02	19.49	5	0.00000
25-P-522A	Vacuum Diesel Product Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	55.9	0.00	0.50	0.01 - 0.50	0.02	0.50	5	0.00000
25-P-522B	Vacuum Diesel Product Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	55.9	0.00	0.50	0.01 - 0.50	0.02	0.50	5	0.00000
25-P-525	Naphtha Splitter Overhead Reflux Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	41.7	0.00	37600.00	340.00 - 39500.00	0.02	37600.10	5	0.00048
25-P-526A	Stabilizer Charge Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	39.6	0.00	26666.67	82.70 - 27000.00	0.02	26666.74	5	0.00032
25-P-526B	Stabilizer Charge Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	39.6	0.00	26666.67	82.70 - 27000.00	0.02	26666.74	5	0.00032
25-P-527A	Stabilizer Overhead Reflux Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.02	2746.01	5	0.00002
25-P-527C	Stabilizer Overhead Reflux Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.02	2746.01	5	0.00002
25-P-528A	Naphtha Splitter Bottoms Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	46.3	0.00	9496.67	92.10 - 9890.00	0.02	9496.69	5	0.00013
25-P-528C	Naphtha Splitter Bottoms Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	46.3	0.00	9496.67	92.10 - 9890.00	0.02	9496.69	5	0.00013
25-P-531A	Vacuum Residue Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	0.19	0.13 - 0.31	0.02	0.19	5	0.00000

TABLE A.20.2. CRUDE - UNIT 25 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft ³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
25-P-531B	Vacuum Residue Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	0.19	0.13 - 0.31	0.02	0.19	5	0.00000
25-P-534A	Desalter Booster Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.02	1366.67	5	0.00002
25-P-534B	Desalter Booster Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.02	1366.67	5	0.00002
25-P-536	LVGO Product Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.9	0.00	140.00	5.01 - 387.00	0.02	140.00	5	0.00000
25-FL-503A	Filter upstream of P-503A	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	0.19	0.13 - 0.31	0.02	0.19	5	0.00000
25-FL-503B	Filter upstream of P-503B	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	0.19	0.13 - 0.31	0.02	0.19	5	0.00000
25-FL-521A	HVGO Filter	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	19.49	0.13 - 58.10	0.02	19.49	5	0.00000
25-FL-521B	HVGO Filter	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	59.7	0.00	19.49	0.13 - 58.10	0.02	19.49	5	0.00000
25-T-601	Crude Distillation Tower	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00009
25-T-602B	Burner Stripper	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.5	0.00	214.88	0.40 - 640.00	0.07	214.88	20	0.00001
25-T-602A	Distillate Stripper	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	0.02 - 50.00	0.07	36.67	20	0.00000
25-T-603	Atmospheric Gas Oil Stripper	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	57.5	0.00	133.49	0.22 - 400.00	0.07	133.49	20	0.00001
25-T-604	Vacuum Tower	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	57.5	0.00	133.49	0.22 - 400.00	0.07	133.49	20	0.00001
25-T-605	Naphtha Splitter	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	46.3	0.00	9498.67	92.10 - 9890.00	0.07	9498.69	20	0.00053
25-T-606	LSR Stabilizer	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	39.6	0.00	38040.00	42.00 - 43000.00	0.07	38040.08	20	0.00173
25-H-1101	Crude Charge Heater	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	25.00 - 1400.00	0.07	1366.67	20	0.00009
25-H-1102	Vacuum Charge Heater	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	57.5	0.00	133.49	0.22 - 400.00	0.07	133.49	20	0.00001

TAB
(Mg/yr)
0.00466

TABLE A.20.3. SOUR WATER STRIPPER - UNIT 26 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
28-D-0721	Stripper Overhead Accumulator	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-D-101	Degassing Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-D-102	Sour Water Overhead Receiver Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-D-701	Acid Gas KO Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-D-706	Blowdown Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-D-708	SW/S Gas KO Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-D-722	Quench KO Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.07	0.00	0.05 - 0.08	0.07	0.07	20	0.00000	
28-E-044	Sour Water Stripper Feed Bottoms Exch.	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-E-0828	Sour Water Stripper Tower Reboiler	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-E-104	Fan Fan Condenser Exchanger	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.20	0.00	0.0005 - 4.83	0.07	0.20	20	0.00000	
28-E-106	Trim Condenser Exchanger	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.20	0.00	0.0005 - 4.83	0.07	0.20	20	0.00000	
28-E-821	Waste Heat Exchanger	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.20	0.00	0.0005 - 4.83	0.07	0.20	20	0.00000	
28-E-822	Quench Water Cooler	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.07	0.00	0.05 - 0.08	0.07	0.07	20	0.00000	
28-E-824A	Lean / Rich Amine Exchanger	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.46	0.00	0.03 - 1.25	0.07	0.46	20	0.00000	
28-E-824B	Lean / Rich Amine Exchanger	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.46	0.00	0.03 - 1.25	0.07	0.46	20	0.00000	
28-E-825	Stripper Reboiler	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-E-826	Stripper OVHD Condenser	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-E-827	Feed Heater	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	
28-FL-101	Quench Water Filter	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.07	0.00	0.05 - 0.08	0.07	0.07	20	0.00000	
28-FL-102	Sump Filter	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.07	0.00	0.05 - 0.08	0.07	0.07	20	0.00000	
28-P-101A	Degasser Bottoms Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-101B	Dégassier Bottoms Pump (Spares)	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-102A (South)	Sour Water Stripper Charge Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-102B (North)	Sour Water Stripper Charge Pump (Spares)	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-103A	Sour Water Stripper Bottom Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	0.20	0.00	0.0005 - 4.83	0.02	0.20	5	0.00000	
28-P-103B	Sour Water Stripper Bottom Pump (Spares)	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	0.20	0.00	0.0005 - 4.83	0.02	0.20	5	0.00000	
28-P-104A (South)	Skim Oil Transfer Pump (Spare)	Maintenance/TA	Uncontrolled	Process Sewer	2	0	100	50.4	0.00	5339.44	77.00 - 20990.00	0.02	5339.45	5	0.00016
28-P-104B (North)	Skim Oil Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	0	100	50.4	0.00	5339.44	77.00 - 20990.00	0.02	5339.45	5	0.00016
28-P-155A	Sour Water Reflux Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-155B	Sour Water Reflux Pump (Spare)	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-503A	Sour Water Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-503B	Sour Water Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-503C	Sour Water Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-521A	Quench Water Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	0.07	0.00	0.05 - 0.08	0.02	0.07	5	0.00000	
28-P-521B	Quench Water Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	0.07	0.00	0.05 - 0.08	0.02	0.07	5	0.00000	
28-P-522A	Rich Solvent Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-522B	Rich Solvent Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-524A	Reflux Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-P-524B	Reflux Pump	Maintenance/TA	Uncontrolled	Process Sewer	2	100	0	18.27	0.00	0.28 - 61.00	0.02	18.27	5	0.00000	
28-T-0102	Sour Water Stripper Tower	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.20	0.00	0.0005 - 4.83	0.07	0.20	20	0.00000	
28-T-622	Quench Tower	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.07	0.00	0.05 - 0.08	0.07	0.07	20	0.00000	
28-T-623	Absorber	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	0.07	0.00	0.05 - 0.08	0.07	0.07	20	0.00000	
28-T-624	Stripper	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	18.27	0.00	0.28 - 61.00	0.07	18.27	20	0.00000	

TAB
(Mg/yr)

0.00034

TABLE A.20.4. DISTILLATE HYDROTREATER - UNIT 32 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
32-D-0014	Salt Dryer (North)	Maintenance/TA	Controlled	Vac Truck	0	50	50	53.2	0.02	41.00	0.01 - 47.00	0.07	18.89	20	0.00000
32-D-0017	Salt Dryer (South)	Maintenance/TA	Controlled	Vac Truck	0	50	50	53.2	0.02	41.00	0.01 - 47.00	0.07	18.89	20	0.00000
32-D-015	Fuel Gas Coalescer	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	14.00	0.08 - 17.00	0.07	14.00	20	0.00000
32-D-10	Interstage KO Drum	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-D-11	High Pressure Separator	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-D-5	Stripper Receiver	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-D-6	Low Pressure Separator	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-D-7	Amine Absorber Feed KO Drum	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	0.00	0.00	0.0005 - 3.30	0.07	0.00	20	0.00000
32-D-9	Recycle Gas KO Drum	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	0.14	0.00	0.08 - 17.00	0.07	0.14	20	0.00000
32-E-0003C	Stripper Feed/Bottoms Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-E-0003D	Stripper Feed/Bottoms Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-E-0003E	Stripper Feed/Bottoms Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-E-0005A	Product Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	41.00	0.01 - 47.00	0.07	41.00	20	0.00000
32-E-0005B	Product Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	41.00	0.01 - 47.00	0.07	41.00	20	0.00000
32-E-0007A	Combined Feed / Reactor Effluent	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	100.00	0.30 - 100.00	0.07	100.00	20	0.00000
32-E-0007B	Combined Feed / Reactor Effluent	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	100.00	0.30 - 100.00	0.07	100.00	20	0.00000
32-E-0007C	Combined Feed / Reactor Effluent	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	100.00	0.30 - 100.00	0.07	100.00	20	0.00000
32-E-0007D	Combined Feed / Reactor Effluent	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	100.00	0.30 - 100.00	0.07	100.00	20	0.00000
32-E-0009A	Reactor Effluent Condenser	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-E-0009B	Reactor Effluent Condenser	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-E-0011	Interstage Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-E-0012	Stripper Condenser	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-H-1	Distillate HDS Charge Heater	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-H-2	Stripper Reboiler	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-P-0182A	Sample Recovery Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	53.2	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
32-P-0182B	Sample Recovery Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	53.2	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
32-P-167A	Distillate DHDS Charge Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	53.2	0.00	100.00	0.30 - 100.00	0.02	100.00	5	0.00000
32-P-167B	Distillate DHDS Charge Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	53.2	0.00	100.00	0.30 - 100.00	0.02	100.00	5	0.00000
32-P-180A	Reboiler Circulating Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	53.2	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
32-P-180B	Reboiler Circulating Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	53.2	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
32-P-4A	Product to Storage Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	53.2	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
32-P-4B	Product to Storage Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	53.2	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
32-P-66A	Stripper Reflux Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	53.2	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
32-P-66B	Stripper Reflux Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	53.2	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
32-R-104	Hydrotreating Reactor	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	100.00	0.30 - 100.00	0.07	100.00	20	0.00000
32-R-105	Hydrotreating Reactor	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	100.00	0.30 - 100.00	0.07	100.00	20	0.00000
32-T-4	Stripper	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	61.67	41.00 - 100.00	0.07	61.67	20	0.00000
32-T-6	Amine Absorber	Maintenance/TA	Controlled	Vac Truck	0	0	100	65.7	0.00	1.80	1.70 - 1.90	0.07	1.80	20	0.00000
32-FL-406	Feed Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	53.2	0.00	100.00	0.30 - 100.00	0.07	100.00	20	0.00000

TAB
(Mg/yr)

0.00002

TABLE A.20.5. SCANFINING/NAPHTHA HYDROTREATER - UNIT 20 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
20-501B	Scanfiner Charge Pumps	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.02	5247.51	5	0.00000
20-D-701	Feed Surge Drum	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-D-702	Reactor Product Separator	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-D-703	Stripper Reflux Drum	Maintenance/TA	Controlled	Vac Truck	0	0	100	43.7	0.00	6298.00	21.20 - 10000.00	0.07	6298.02	20	0.00000
20-D-704	Recycle Compressor Suction Drum	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	38.71	0.00	13.50 - 16500.00	0.07	38.71	20	0.00000
20-E-0822A	Lube Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	50.0	0.00	0.50	0.50 - 0.50	0.07	0.50	20	0.00000
20-E-0822B	Lube Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	50.0	0.00	0.50	0.50 - 0.50	0.07	0.50	20	0.00000
20-E-801A	Saturator Feed/Reactor Effluent Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-E-801B	Saturator Feed/Reactor Effluent Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-E-801C	Saturator Feed/Reactor Effluent Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-E-803A	Reactor Feed/Effluent Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-E-803B	Reactor Feed/Effluent Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-E-803C	Reactor Feed/Effluent Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-E-804A	Reactor Effluent Air Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-E-804B	Reactor Effluent Air Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-E-805A	Reactor Effluent Trim Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-E-805B	Reactor Effluent Trim Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-E-806A	Stripper Feed/Bottoms Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-E-806B	Stripper Feed/Bottoms Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-E-806C	Stripper Feed/Bottoms Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-E-807	Product Stripper Reboiler	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-E-808	Product Air Cooler	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	38.71	0.00	13.50 - 16500.00	0.07	38.71	20	0.00000
20-E-810	Stripper Overhead Condenser	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	62.98	0.00	21.20 - 10000.00	0.07	62.98	20	0.00000
20-E-811	Stripper Overhead Trim Corder	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	62.98	0.00	21.20 - 10000.00	0.07	62.98	20	0.00000
20-F-0300A	Hydrocarbon Basket Strainer	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-F-0300B	Hydrocarbon Basket Strainer	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-F-0302A	Aqueous Basket Strainer	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	38.71	0.00	13.50 - 16500.00	0.07	36.71	20	0.00000
20-F-0302B	Aqueous Basket Strainer	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	38.71	0.00	13.50 - 16500.00	0.07	36.71	20	0.00000
20-F-0305A	Lube Oil Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	50.0	0.00	0.50	0.50 - 0.50	0.07	0.50	20	0.00000
20-F-0305B	Lube Oil Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	50.0	0.00	0.50	0.50 - 0.50	0.07	0.50	20	0.00000
20-F-0306A	Absolute Coalescing Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-F-0306B	Absolute Coalescing Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-F-0307A	Absolute Coalescing Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-F-0307B	Absolute Coalescing Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-F-301A	Feed Filters	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-F-301B	Feed Filters	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-H-201	Charge Heater	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
20-P-0500A	Caustic Recycle Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	51.5	0.00	753.00	6.50 - 870.00	0.02	763.00	5	0.00002
20-P-0500B	Caustic Recycle Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	51.5	0.00	753.00	6.50 - 870.00	0.02	763.00	5	0.00002
20-P-0507A	Lube Oil Main Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	50.0	0.00	0.50	0.50 - 0.50	0.02	0.50	5	0.00000
20-P-0507B	Lube Oil Stand-by Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	50.0	0.00	0.50	0.50 - 0.50	0.02	0.50	5	0.00000
20-P-501A	Reactor Feed Pumps	Maintenance/TA	Controlled	Vac Truck	2	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.02	5247.51	5	0.00015
20-P-501B	Reactor Feed Pumps	Maintenance/TA	Controlled	Vac Truck	2	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.02	5247.51	5	0.00015
20-P-502A	Stripper Reflux Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.02	7817.24	5	0.00021
20-P-502B	Stripper Reflux Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.02	7817.24	5	0.00021
20-P-505A	Wash Water Recirculation Pump	Maintenance/TA	Controlled	Vac Truck	2	100	0	0.0	34.50	0.00	20.00 - 22000.00	0.02	34.50	5	0.00000
20-P-505B	Wash Water Recirculation Pump	Maintenance/TA	Controlled	Vac Truck	2	100	0	0.0	34.50	0.00	20.00 - 22000.00	0.02	34.50	5	0.00000
20-R-102	Scanfining Reactor	Maintenance/TA	Controlled	Vac Truck	0	0	100	48.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000

TABLE A.20.5. SCANFINING/NAPHTHA HYDROTREATER - UNIT 20 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
20-T-0600	Phase Separator	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-T-601	Product Stripper	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.9	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
20-T-602	Amine Scrubber	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	0.01	0.00	0.01 - 1.00	0.07	0.01	20	0.00000
														TAB (Mg/yr)	
														0.00077	

**TABLE A.20.6. FLUID CATALYTIC CRACKING - UNIT 34 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft ³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
34-D-067	Low Pressure Suction Drum	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.0	0.00	9206.00	12.70 - 24000.00	0.07	9206.02	20	0.00000
34-D-098	Overhead Receiver	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	92.06	0.00	12.70 - 24000.00	0.07	92.06	20	0.00000
34-D-100	Interstage KO Drum	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	163.50	0.00	120.00 - 20700.00	0.07	163.50	20	0.00000
34-E-001D	Interstage Gas Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	43.4	0.00	16350.00	120.00 - 20700.00	0.07	16350.04	20	0.00000
34-E-001E	Interstage Gas Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	43.4	0.00	16350.00	120.00 - 20700.00	0.07	16350.04	20	0.00000
34-E-001F	Interstage Gas Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	43.4	0.00	16350.00	120.00 - 20700.00	0.07	16350.04	20	0.00000
34-E-0021	Light Recycle/Boiler Feed Wtr.	Maintenance/TA	Controlled	Vac Truck	0	0	100	57.4	0.00	85.60	0.05 - 355.00	0.07	85.60	20	0.00000
34-E-003	Naphtha Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.07	5529.76	20	0.00000
34-E-0041	Light Cycle Oil /Gas Oil Feed	Maintenance/TA	Controlled	Vac Truck	0	0	100	57.4	0.00	85.60	0.05 - 355.00	0.07	85.60	20	0.00000
34-E-0079	Light Recycle Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	57.4	0.00	85.60	0.05 - 355.00	0.07	85.60	20	0.00000
34-E-0100	Slurry/Gas Oil Feed Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	64.7	0.00	60.44	0.02 - 162.00	0.07	60.44	20	0.00000
34-E-0130A	Horizontal Slurry Steam Generator	Maintenance/TA	Controlled	Vac Truck	0	0	100	64.7	0.00	60.44	0.02 - 162.00	0.07	60.44	20	0.00000
34-E-0132A	Lube Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	49.1	0.00	2.34	0.02 - 19.00	0.07	2.34	20	0.00000
34-E-0132B	Lube Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	49.1	0.00	2.34	0.02 - 19.00	0.07	2.34	20	0.00000
34-E-0200	Primary Slurry/Gas Oil Feed Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	64.7	0.00	60.44	0.02 - 162.00	0.07	60.44	20	0.00000
34-E-043	Light Cycle Oil Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	57.4	0.00	85.60	0.05 - 355.00	0.07	85.60	20	0.00000
34-E-0027	After Condenser	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	92.06	0.00	12.70 - 24000.00	0.07	92.06	20	0.00000
34-E-0026	Inter Condenser	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	92.06	0.00	12.70 - 24000.00	0.07	92.06	20	0.00000
34-E-124-A1	Overhead Condenser	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	92.06	0.00	12.70 - 24000.00	0.07	92.06	20	0.00000
34-E-124-A2	Overhead Condenser	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	92.06	0.00	12.70 - 24000.00	0.07	92.06	20	0.00000
34-E-124-A3	Overhead Condenser	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	92.06	0.00	12.70 - 24000.00	0.07	92.06	20	0.00000
34-E-124-A4	Overhead Condenser	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	92.06	0.00	12.70 - 24000.00	0.07	92.06	20	0.00000
34-E-124BB	Overhead Condenser	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	92.06	0.00	12.70 - 24000.00	0.07	92.06	20	0.00000
34-E-124BT	Overhead Condenser	Maintenance/TA	Controlled	Vac Truck	0	100	0	0.0	92.06	0.00	12.70 - 24000.00	0.07	92.06	20	0.00000
34-E-125B	Slurry/Gas Oil Feed Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	64.7	0.00	60.44	0.02 - 162.00	0.07	60.44	20	0.00000
34-E-134A	Lube Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	49.1	0.00	2.34	0.02 - 19.00	0.07	2.34	20	0.00000
34-E-134B	Lube Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	49.1	0.00	2.34	0.02 - 19.00	0.07	2.34	20	0.00000
34-E-16A	Flush Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	57.4	0.00	85.60	0.05 - 355.00	0.07	85.60	20	0.00000
34-E-800	Light Cycle Oil Cooler Fin Fan	Maintenance/TA	Controlled	Vac Truck	0	0	100	57.4	0.00	85.60	0.05 - 355.00	0.07	85.60	20	0.00000
34-FL-0102	1st Stage Oil Reclaimer Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	58.4	0.00	2.54	0.09 - 8.10	0.07	2.54	20	0.00000
34-FL-0103	2nd Stage Oil Reclaimer Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	58.4	0.00	2.54	0.09 - 8.10	0.07	2.54	20	0.00000
34-FL-0104A	Filter associated with 134A Lube Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	49.1	0.00	2.34	0.02 - 19.00	0.07	2.34	20	0.00000
34-FL-0104B	Filter associated with 134B Lube Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	49.1	0.00	2.34	0.02 - 19.00	0.07	2.34	20	0.00000
34-FL-110	Fuel Gas Coalescer	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	285.00	2.50 - 320.00	0.07	285.00	20	0.00000
34-H-002	Gas Oil Heater	Maintenance/TA	Controlled	Vac Truck	0	0	100	58.4	0.00	2.54	0.09 - 8.10	0.07	2.54	20	0.00000
34-P-0087	Low Pressure Suction Drum Transfer Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	44.0	0.00	9208.00	12.70 - 24000.00	0.02	9208.02	5	0.00012
34-P-008A	Naphtha Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.02	5529.76	5	0.00008
34-P-006B	Naphtha Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.02	5529.76	5	0.00008
34-P-039	Interstage KO Pump	Maintenance/TA	Controlled	Vac Truck	1	100	0	0.0	163.50	0.00	120.00 - 20700.00	0.02	163.50	5	0.00000
34-P-0502	Oil Reclaimer Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	58.4	0.00	2.54	0.09 - 8.10	0.02	2.54	5	0.00000
34-P-0503A	Lube Oil Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	49.1	0.00	2.34	0.02 - 19.00	0.02	2.34	5	0.00000
34-P-0503B	Lube Oil Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	49.1	0.00	2.34	0.02 - 19.00	0.02	2.34	5	0.00000
34-P-106	Vacuum Gas Oil Pumps	Maintenance/TA	Controlled	Vac Truck	1	0	100	58.4	0.00	2.54	0.09 - 8.10	0.02	2.54	5	0.00000
34-P-107	Vacuum Gas Oil Feed Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	58.4	0.00	2.54	0.09 - 8.10	0.02	2.54	5	0.00000
34-P-108	Vacuum Gas Oil Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	58.4	0.00	2.54	0.09 - 8.10	0.02	2.54	5	0.00000
34-P-109	Vacuum Gas Oil Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	58.4	0.00	2.54	0.09 - 8.10	0.02	2.54	5	0.00000
34-P-110	Slurry Bottoms Pump to Gas Oil Exchanger	Maintenance/TA	Controlled	Vac Truck	1	0	100	64.7	0.00	60.44	0.02 - 162.00	0.02	60.44	5	0.00000

TABLE A.20.6. FLUID CATALYTIC CRACKING - UNIT 34 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lb/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
34-P-111	Slurry Bottoms Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	64.7	0.00	60.44	0.02 - 162.00	0.02	60.44	5	0.00000
34-P-112	Light Cycle to Storage Pump(Spare)	Maintenance/TA	Controlled	Vac Truck	1	0	100	57.4	0.00	85.60	0.05 - 355.00	0.02	85.60	5	0.00000
34-P-113	Light Cycle to Storage Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	57.4	0.00	85.60	0.05 - 355.00	0.02	85.60	5	0.00000
34-P-114	Reflux Pump	Maintenance/TA	Controlled	Vac Truck	1	100	0	0.0	82.06	0.00	12.70 - 24000.00	0.02	92.06	5	0.00000
34-P-128	Flush Oil Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	57.4	0.00	85.60	0.05 - 355.00	0.02	85.60	5	0.00000
34-P-184	Slurry Pump to Steam Generator	Maintenance/TA	Controlled	Vac Truck	1	0	100	64.7	0.00	60.44	0.02 - 162.00	0.02	60.44	5	0.00000
34-P-188	Sponge Oil Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	60.1	0.00	325.00	0.05 - 355.00	0.02	325.00	5	0.00001
34-P-189	Slurry Pump to Steam Generator	Maintenance/TA	Controlled	Vac Truck	1	0	100	64.7	0.00	60.44	0.02 - 162.00	0.02	60.44	5	0.00000
34-P-216	Slurry Pump to Storage	Maintenance/TA	Controlled	Vac Truck	1	0	100	64.7	0.00	60.44	0.02 - 162.00	0.02	60.44	5	0.00000
34-P-3	Flush Oil Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	57.4	0.00	85.60	0.05 - 355.00	0.02	85.60	5	0.00000
34-P-504	Sour Water Boot Pump	Maintenance/TA	Controlled	Vac Truck	1	100	0	0.0	37.89	0.00	17.00 - 77.10	0.02	37.89	5	0.00000
34-P-LU-001	Main Lube Oil Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	49.1	0.00	2.34	0.02 - 19.00	0.02	2.34	5	0.00000
34-P-LU-002	Auxiliary Lube Oil Pump	Maintenance/TA	Controlled	Vac Truck	1	0	100	49.1	0.00	2.34	0.02 - 19.00	0.02	2.34	5	0.00000
34-R-078	Reactor FCC Unit	Maintenance/TA	Controlled	Vac Truck	0	0	100	51.2	0.00	84.33	0.48 - 110.00	0.07	84.33	20	0.00000
34-T-095	Main Fractionator	Maintenance/TA	Controlled	Vac Truck	0	0	100	64.7	0.00	60.44	0.02 - 162.00	0.07	60.44	20	0.00000
34-T-097	Recycle Stripper	Maintenance/TA	Controlled	Vac Truck	0	0	100	57.4	0.00	85.60	0.05 - 355.00	0.07	85.60	20	0.00000

TAB
(Mg/yr)

0.00030

TABLE A.20.7. HYDROBON - UNIT 27 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lb/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
27-D-106	Hydrobon Product Separator	Maintenance/TA	Controlled	Vac Truck	0	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
27-D-109	Debutanizer Receiver	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.07	10291.70	20	0.00000
27-E-0101	Jet Base Fin Fan	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.07	10291.70	20	0.00000
27-E-0104A	Combined Feed Effluent Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
27-E-0104B	Combined Feed Effluent Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
27-E-0104C	Combined Feed Effluent Exchanger	Maintenance/TA	Controlled	Vac Truck	0	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
27-E-0105A	Reactor Product Condenser	Maintenance/TA	Controlled	Vac Truck	0	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
27-E-0105B	Reactor Product Condenser	Maintenance/TA	Controlled	Vac Truck	0	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
27-E-0108	Debutanizer Feed/Bottoms	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.07	10291.70	20	0.00000
27-E-0107	Debutanizer Ovhd Condenser	Maintenance/TA	Controlled	Vac Truck	0	0	100	38.0	0.00	9587.00	20.00 - 18000.00	0.07	9587.02	20	0.00000
27-H-103	Debutanizer Reboiler	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.07	10291.70	20	0.00000
27-P-104A	Hydrocarbon Charge Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.02	5247.51	5	0.00015
27-P-106A	Debutanizer Reboiler Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.02	10291.70	5	0.00028
27-P-106B	Debutanizer Reboiler Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.02	10291.70	5	0.00028
27-P-107	Debut. Reflux Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.02	10291.70	5	0.00028
27-P-169	Debut. Reflux Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.02	10291.70	5	0.00028
27-R-104	Hydrobon Reactor	Maintenance/TA	Controlled	Vac Truck	0	0	100	46.7	0.00	5247.50	61.00 - 9000.00	0.07	5247.51	20	0.00000
27-T-108	Debutanizer	Maintenance/TA	Controlled	Vac Truck	0	0	100	44.3	0.00	10291.67	2010.00 - 17700.00	0.07	10291.70	20	0.00000

TAB
(Mg/yr)

0.00125

TABLE A.20.8. PLATFORMER - UNIT 31 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lb/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
31-D-118	Low Pressure Separator	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	133.00	0.17 - 133.00	0.07	133.00	20	0.00000
31-D-119	High Pressure Separator	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	133.00	0.17 - 133.00	0.07	133.00	20	0.00000
31-D-122	Stabilizer Receiver	Maintenance/TA	Controlled	Vac Truck	0	0	100	50.9	0.00	28590.00	39.00 - 40000.00	0.07	28590.07	20	0.00000
31-D-123	Platformer Charge Surge Drum	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-E-0110A	Platformer Comb. Feed Eff. (A)	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-E-0110B	Platformer Comb. Feed Eff. (B)	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-E-0111	Platformer Reactor Prod. Cond.	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-E-0113A	Stabilizer Feed / Bottoms	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-E-0113B	Stabilizer Feed / Bottoms	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-E-0113C	Stabilizer Feed / Bottoms	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-E-0121A	Lube Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	49.1	0.00	2.34	0.02 - 19.00	0.07	2.34	20	0.00000
31-E-0121B	Lube Oil Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	49.1	0.00	2.34	0.02 - 19.00	0.07	2.34	20	0.00000
31-E-112	High Pressure Separator Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	133.00	0.17 - 133.00	0.07	133.00	20	0.00000
31-E-114A	Stabilizer Bottoms Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	50.9	0.00	28590.00	39.00 - 40000.00	0.07	28590.07	20	0.00000
31-E-114B	Stabilizer Bottoms Cooler	Maintenance/TA	Controlled	Vac Truck	0	0	100	50.9	0.00	28590.00	39.00 - 40000.00	0.07	28590.07	20	0.00000
31-E-115	Stabilizer Condenser	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	133.00	0.17 - 133.00	0.07	133.00	20	0.00000
31-FL-101A	Lube Oil Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	49.1	0.00	2.34	0.02 - 19.00	0.07	2.34	20	0.00000
31-FL-101B	Lube Oil Filter	Maintenance/TA	Controlled	Vac Truck	0	0	100	49.1	0.00	2.34	0.02 - 19.00	0.07	2.34	20	0.00000
31-H-108	Platformer Stabilizer Reboiler	Maintenance/TA	Controlled	Vac Truck	0	0	100	50.9	0.00	28590.00	39.00 - 40000.00	0.07	28590.07	20	0.00000
31-H-104	Platformer Charge Heater	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-H-105	Platformer No.1 Inner Heater	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-H-106	Platformer No.2 Inner Heater	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-H-107	Platformer No.3 Inner Heater	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-P-110A	Reactor Charge Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.02	18820.88	5	0.00052
31-P-110B	Reactor Charge Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.02	18820.88	5	0.00052
31-P-113A	Low Pressure Separator Bottoms Pump (Electric)	Maintenance/TA	Controlled	Vac Truck	2	0	100	45.3	0.00	133.00	0.17 - 133.00	0.02	133.00	5	0.00000
31-P-113B	Low Pressure Separator Bottoms Pump (Steam)	Maintenance/TA	Controlled	Vac Truck	2	0	100	45.3	0.00	133.00	0.17 - 133.00	0.02	133.00	5	0.00000
31-P-115	Stabilizer Reboiler Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	50.9	0.00	28590.00	39.00 - 40000.00	0.02	28590.07	5	0.00088
31-P-116	Stabilizer Reflux Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	50.9	0.00	28590.00	39.00 - 40000.00	0.02	28590.07	5	0.00088
31-P-173	Stabilizer Reflux Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	50.9	0.00	28590.00	39.00 - 40000.00	0.02	28590.07	5	0.00088
31-P-500A	Metering Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	45.3	0.00	133.00	0.17 - 133.00	0.02	133.00	5	0.00000
31-P-LU-0001	Lube Oil Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	49.1	0.00	2.34	0.02 - 19.00	0.02	2.34	5	0.00000
31-P-LU-0002	Lube Oil Pump	Maintenance/TA	Controlled	Vac Truck	2	0	100	49.1	0.00	2.34	0.02 - 19.00	0.02	2.34	5	0.00000
31-R-112	Reactor Platformer No.1	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-R-113	Reactor Platformer No.2	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-R-114	Reactor Platformer No.3	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-R-115	Reactor Platformer No.4	Maintenance/TA	Controlled	Vac Truck	0	0	100	45.3	0.00	18820.83	22.00 - 46000.00	0.07	18820.88	20	0.00000
31-T-121	Stabilizer	Maintenance/TA	Controlled	Vac Truck	0	0	100	50.9	0.00	28590.00	39.00 - 40000.00	0.07	28590.07	20	0.00000

TAB
(Mg/yr)

0.00369

TABLE A.20.9. AMINE TREATER - UNIT 24 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
24-D-0001	LP Inlet Gas Knock-Out Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	2.85	0.00	2.85	2.50 - 320.00	0.07	2.85	20	0.00000
24-D-0004	Rich Amine Flash Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.07	1140.00	20	0.00000
24-D-0005	Reflux Accumulator	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	68.6	0.00	1.00	0.01 - 1.00	0.07	1.00	20	0.00000
24-D-0006	LP Sweet Gas KO Drum	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	2.85	0.00	2.85	2.50 - 320.00	0.07	2.85	20	0.00000
24-E-0003A	Lean/Rich Exchanger	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.07	1140.00	20	0.00000
24-E-0003B	Lean/Rich Exchanger	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.07	1140.00	20	0.00000
24-E-0004A	Reflux Condenser	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	68.6	0.00	1.00	0.01 - 1.00	0.07	1.00	20	0.00000
24-E-0004B	Reflux Condenser	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	68.6	0.00	1.00	0.01 - 1.00	0.07	1.00	20	0.00000
24-E-0005	Regenerator Reboiler	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.07	1140.00	20	0.00000
24-F-0002	Amine Sump Pump Filter	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.07	1140.00	20	0.00000
24-P-0001A	Rich Amine Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.02	1140.00	5	0.00002
24-P-0001B	Rich Amine Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.02	1140.00	5	0.00002
24-P-0002A	Reflux Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	68.6	0.00	1.00	0.01 - 1.00	0.02	1.00	5	0.00000
24-P-0002B	Reflux Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	68.6	0.00	1.00	0.01 - 1.00	0.02	1.00	5	0.00000
24-P-0005	Amine Make-Up Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.02	1140.00	5	0.00002
24-P-0006	Amine Sump Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.02	1140.00	5	0.00002
24-P-0007A	Hydrocarbon Slop Oil Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.02	1140.00	5	0.00002
24-P-0007B	Hydrocarbon Slop Oil Pumps	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.02	1140.00	5	0.00002
24-SU-0001	Amine Sump Tank	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.07	1140.00	20	0.00000
24-T-0001	LP Gas Contactor	Maintenance/TA	Uncontrolled	Process Sewer	0	100	0	2.85	0.00	2.85	2.50 - 320.00	0.07	2.85	20	0.00000
24-T-0003	Amine Regenerator	Maintenance/TA	Uncontrolled	Process Sewer	0	0	100	50.6	0.00	1140.00	1100.00 - 1170.00	0.07	1140.00	20	0.00000

TAB
(Mg/yr)

0.00010

**TABLE A.20.10. GAS CONCENTRATION - UNIT 28 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
28-D-0072	Debutanizer Receiver	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	42.4	0.00	34840.00	348.00 - 34840.00	0.07	34840.09	20	0.00000
28-D-075	Fuel Gas Knock-out Pot	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	100	0	0.0	31.50	0.00	31.50 - 3150.00	0.07	31.50	20	0.00000
28-D-69	Stripper Charge Drum	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.07	2746.01	20	0.00000
28-E-0001A	Stripper Charge Drum Cooler (A)	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.07	2746.01	20	0.00000
28-E-0001B	Stripper Charge Drum Cooler (B)	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.07	2746.01	20	0.00000
28-E-0001C	Stripper Charge Drum Cooler (C)	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.07	2746.01	20	0.00000
28-E-0011	Stripper Reboiler (West)	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.07	2746.01	20	0.00000
28-E-0132A	Debutanizer OVHD Condenser	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	100	0	0.0	0.30	0.00	0.08 - 0.62	0.07	0.30	20	0.00000
28-E-0132B	Debutanizer OVHD Condenser	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	100	0	0.0	0.30	0.00	0.08 - 0.62	0.07	0.30	20	0.00000
28-E-0133	Absorber Intercooler	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	44.8	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000
28-E-0135	Stripper Feed Preheater	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.07	2746.01	20	0.00000
28-E-0136	Debutanizer Bottoms Cooler	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	42.4	0.00	34840.00	348.00 - 34840.00	0.07	34840.09	20	0.00000
28-E-0137	Stripper Reboiler Preheater	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.07	2746.01	20	0.00000
28-E-0138	Debutanizer Bottoms Cooler	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	42.4	0.00	34840.00	348.00 - 34840.00	0.07	34840.09	20	0.00000
28-E-0211	Stripper Reboiler (East)	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.07	2746.01	20	0.00000
28-H-0004F	Debutanizer Heater	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	42.4	0.00	34840.00	348.00 - 34840.00	0.07	34840.09	20	0.00000
28-P-0071	Primary Bottoms Spare Pump	Maintenance/TA	Controlled	Blowdown/Vac Truck	1	0	100	44.8	0.00	7817.22	13.50 - 16500.00	0.02	7817.24	5	0.00011
28-P-0074	East Debutanizer Overhead Pump	Maintenance/TA	Controlled	Blowdown/Vac Truck	1	100	0	0.0	0.30	0.00	0.08 - 0.62	0.02	0.30	5	0.00000
28-P-0075	West Debutanizer Overhead Pump	Maintenance/TA	Controlled	Blowdown/Vac Truck	1	100	0	0.0	0.30	0.00	0.08 - 0.62	0.02	0.30	5	0.00000
28-P-0203	Primary Bottoms Spare Pump	Maintenance/TA	Controlled	Blowdown/Vac Truck	1	0	100	44.8	0.00	7817.22	13.50 - 16500.00	0.02	7817.24	5	0.00011
28-P-0280	Primary Bottoms Pump	Maintenance/TA	Controlled	Blowdown/Vac Truck	1	0	100	44.8	0.00	7817.22	13.50 - 16500.00	0.02	7817.24	5	0.00011
28-P-261	Stripper Charge Spare Pump	Maintenance/TA	Controlled	Blowdown/Vac Truck	1	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.02	2746.01	5	0.00002
28-P-288	Stripper Charge Pump	Maintenance/TA	Controlled	Blowdown/Vac Truck	1	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.02	2746.01	5	0.00002
28-P-76A	Debutanizer Reboiler Pump	Maintenance/TA	Controlled	Blowdown/Vac Truck	1	0	100	42.4	0.00	34840.00	348.00 - 34840.00	0.02	34840.09	5	0.00045
28-P-76B	Debutanizer Reboiler Pump	Maintenance/TA	Controlled	Blowdown/Vac Truck	1	0	100	42.4	0.00	34840.00	348.00 - 34840.00	0.02	34840.09	5	0.00045
28-T-0070	Secondary Absorber	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	60.1	0.00	325.00	236.00 - 474.00	0.07	325.00	20	0.00000
28-T-0071	Debutanizer	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	42.4	0.00	34840.00	348.00 - 34840.00	0.07	34840.09	20	0.00000
28-T-0200	Stripper	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	28.7	0.00	2746.00	1.25 - 5680.00	0.07	2746.01	20	0.00000
28-T-131	Primary Absorber	Maintenance/TA	Controlled	Blowdown/Vac Truck	0	0	100	44.8	0.00	7817.22	13.50 - 16500.00	0.07	7817.24	20	0.00000

TAB
(Mg/yr)

0.00126

TABLE A.20.11. ALKYLATION MEROX - UNIT 35 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
35D-022	Alkylate KOH Wash Drum	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	43.2	0.00	53.25	0.70 - 76.50	0.07	53.25	20	0.00000
35-D-27	Fuel Gas KO Pot	Maintenance/TA	Controlled	Trough/Vac Truck	0	100	0	0.0	0.14	0.00	0.06 - 17.00	0.07	0.14	20	0.00000
35-E-0004	Field Butane / Naphtha	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.07	5529.76	20	0.00000
35-E-0005	Alkylate Product Cooler	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	43.2	0.00	53.25	0.70 - 76.50	0.07	53.25	20	0.00000
35-E-0008	IsoStripper Feed / Bottoms	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	43.2	0.00	53.25	0.70 - 76.50	0.07	53.25	20	0.00000
35-E-0007	IsoStripper Feed / FCC Naphtha Exchanger	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.07	5529.76	20	0.00000
35-E-0008	Alkylate Flush Cooler	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	43.2	0.00	53.25	0.70 - 76.50	0.07	53.25	20	0.00000
35-E-0010	IsoStripper Side Cut Reboiler	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	43.2	0.00	53.25	0.70 - 76.50	0.07	53.25	20	0.00000
35-E-0023	Depropanizer Feed Preheater	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	45.5	0.00	5529.75	2.65 - 12100.00	0.07	5529.76	20	0.00000
35-P-0007A	IsoStripper Reboiler Recirc Pump	Maintenance/TA	Controlled	Trough/Vac Truck	2	0	100	43.2	0.00	53.25	0.70 - 76.50	0.02	53.25	5	0.00000
35-P-0007B	IsoStripper Reboiler Recirc Pump	Maintenance/TA	Controlled	Trough/Vac Truck	2	0	100	43.2	0.00	53.25	0.70 - 76.50	0.02	53.25	5	0.00000
35-T-0008	IsoStripper	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	43.2	0.00	53.25	0.70 - 76.50	0.07	53.25	20	0.00000
35-D-1	Caustic Prewash Scrubber	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	64.2	0.00	11.79	0.10 - 20.00	0.07	11.79	20	0.00000
35-D-2	Caustic Prewash Scrubber	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	64.2	0.00	11.79	0.10 - 20.00	0.07	11.79	20	0.00000
35-FL-0041	Flush Filter "SCOT" Pot	Maintenance/TA	Controlled	Trough/Vac Truck	0	0	100	43.2	0.00	53.25	0.70 - 76.50	0.07	53.25	20	0.00000

TAB
(Mg/yr)

0.00000

TABLE A.20.12. BUTAMER - UNIT 37 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
37-D-11	Butane Coalescer	Maintenance/TA	NA	NA	0	100	0	0.0	0.00	0.00	0.00	0.07	0.00	20	0.00000
37-D-12	Dryers Regeneration Coalescer	Maintenance/TA	NA	NA	0	100	0	0.0	0.00	0.00	0.00	0.07	0.00	20	0.00000
37-D-0015	Dryers Regeneration Coalescer	Maintenance/TA	NA	NA	0	100	0	0.0	0.00	0.00	0.00	0.18	0.00	50	0.00000
37-D-014	"Hot Oil" Fuel Gas Knock-out Pot	Maintenance/TA	NA	NA	0	100	0	0.0	0.00	0.00	0.00	0.02	0.00	5	0.00000
37-T-0007	Heater Stabilizer Off-Gas Scrubber	Maintenance/TA	NA	NA	0	100	0	0.0	0.00	0.00	0.00	0.02	0.00	5	0.00000
														TAB (Mg/yr)	
														0.00000	

TABLE A.20.13. NEW AMINE - UNIT 34 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
21-D-2111	DEA Contactor KO Drum	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-T-2110	DEA Contactor	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-E-2122A	Lean-Rich DEA Exchanger	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-E-2122B	Lean-Rich DEA Exchanger	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-E-2122C	Lean-Rich DEA Exchanger	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-D-2120A	DEA Regenerator Reboiler Condensate Pot	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-D-2120B	DEA Regenerator Reboiler Condensate Pot	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-E-2120A	DEA Regenerator Reboiler	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-E-2120B	DEA Regenerator Reboiler	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-T-2120	DEA Regenerator	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-F-2111	Lean DEA Carbon Filter	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-F-2112	Carbon Afterfilter	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-D-2122	Rich Amine Flash Drum	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-P-0004A	Hydrocarbon Slop Oil Pumps	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.02	0.00	5.00	0.00000
21-P-0004B	Hydrocarbon Slop Oil Pumps	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.02	0.00	5.00	0.00000
21-P-2153A	Rich Amine Pump	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.02	0.00	5.00	0.00000
21-P-2153B	Rich Amine Pump	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.02	0.00	5.00	0.00000
21-D-2121	DEA Regenerator Reflux Drum	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-E-2121	DEA Regenerator Overhead Condenser	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.07	0.00	20.00	0.00000
21-P-2121A	DEA Regenerator Reflux Pump	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.02	0.00	5.00	0.00000
21-P-2121B	DEA Regenerator Reflux Pump	Maintenance/TA	Controlled	To DO and AS	0	100	0	0.00	0.00	0.00	0.02	0.00	5.00	0.00000

TAB
(Mg/yr)

0.00000

TABLE A.20.14. #3 SULFUR RECOVERY UNIT - UNIT 23 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
23-D-002	Sour Water Stripper Gas Scrubber	Maintenance/TA	Controlled	NA	0	100	0	0.00	0.00	0.00	0.07	0.00	20	0.00000
23-D-001	Acid Gas Scrubber	Maintenance/TA	Controlled	NA	0	100	0	0.00	0.00	0.00	0.07	0.00	20	0.00000
23-P-0003	SRU Scrubber Pump	Maintenance/TA	Controlled	NA	0	100	0	0.00	0.00	0.00	0.02	0.00	5	0.00000
23-P-0004	SRU Scrubber Pump	Maintenance/TA	Controlled	NA	0	100	0	0.00	0.00	0.00	0.02	0.00	5	0.00000
23-P-0005	Sour Water Stripper Gas Scrubber Pump	Maintenance/TA	Controlled	NA	0	100	0	0.00	0.00	0.00	0.02	0.00	5	0.00000
23-P-0006	Sour Water Stripper Gas Scrubber Pump	Maintenance/TA	Controlled	NA	0	100	0	0.00	0.00	0.00	0.02	0.00	5	0.00000
23-H-0001	Reactor Furnace	Maintenance/TA	Controlled	NA	0	100	0	0.00	0.00	0.00	0.07	0.00	20	0.00000
23-E-001	Waste Heat Reclaimer	Maintenance/TA	Controlled	NA	0	100	0	0.00	0.00	0.00	0.07	0.00	20	0.00000
23-E-0002	Sulfur Condenser	Maintenance/TA	Controlled	NA	0	100	0	0.00	0.00	0.00	0.07	0.00	20	0.00000
23-R-0001	Reactor	Maintenance/TA	Controlled	NA	0	100	0	0.00	0.00	0.00	0.07	0.00	20	0.00000

TAB
(Mg/yr)

0.00000

TABLE A.20.15. LOADING AND UNLOADING - UNIT 40 MAINTENANCE AND TURNAROUND STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lb/m³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
40-1-P-805A	Pump Associated with Tank 17 (Gasoline)	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	45.4	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020
40-1-P-805B	Pump Associated with Tank 17 (Gasoline)	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	45.4	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020
40-1-P-804A	Pump Associated with Tank 15 (Gasoline)	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	45.4	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020
40-1-P-804B	Pump Associated with Tank 15 (Gasoline)	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	45.4	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020
40-1-P-803A	Pump Associated with Tank 14 (Distillate)	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.2	0.00	100.00	100.00 - 100.00	0.02	100.00	5	0.00000
40-1-P-803B	Pump Associated with Tank 14 (Distillate)	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.2	0.00	100.00	100.00 - 100.00	0.02	100.00	5	0.00000
40-1-P-65	Pump Associated with Tank 28 (LSR Naphtha)	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	45.6	0.00	5933.33	5600.00 - 6500.00	0.02	5933.35	5	0.00008
															TAB (Mg/yr) 0.00090

**TABLE A.20.16 STORAGE AND HANDLING PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft ³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
40-2-P-307	Coker Naphtha Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	46.8	0.00	1983.33	270.00 - 3100.00	0.02	1983.34	5	0.00003
40-2-P-144	Cat Gas to Blender Charge Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	44.9	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020
40-2-P-074B	Crude Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	1300.00 - 1400.00	0.02	1366.67	5	0.00002
40-2-P-074A	Crude Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	1300.00 - 1400.00	0.02	1366.67	5	0.00002
40-2-P-145	Reformate to Blender Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.1	0.00	12384.00	7.99 - 39000.00	0.02	12384.03	5	0.00019
NA	Filter Associated with 40-2-TK-34	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.1	0.00	12384.00	7.99 - 39000.00	0.02	12384.03	5	0.00019
NA	Filter Associated with 40-2-TK-35	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	43.2	0.00	53.25	0.70 - 76.50	0.02	53.25	5	0.00000
40-2-P-0325A	Scanning Unit Cold Charge Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	45.5	0.00	5933.33	5600.00 - 6500.00	0.02	5933.35	5	0.00008
40-2-P-0325B	Scanning Unit Cold Charge Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	45.5	0.00	5933.33	5600.00 - 6500.00	0.02	5933.35	5	0.00008
40-2-P-284	No Lead Gasoline Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	44.8	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020
40-2-P-282	No Lead Gasoline Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	44.9	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020
40-2-PW-293	No Lead Gasoline Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	44.9	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020
40-2-P-275	Crude Booster Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	1300.00 - 1400.00	0.02	1366.67	5	0.00002
40-2-P-276	Crude Booster Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	1300.00 - 1400.00	0.02	1366.67	5	0.00002
40-2-P-274	Crude Booster Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	1300.00 - 1400.00	0.02	1366.67	5	0.00002
40-2-P-273	Crude Booster Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	54.3	0.00	1366.67	1300.00 - 1400.00	0.02	1366.67	5	0.00002
40-2-P-302	Gasoline Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	44.9	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020
40-2-P-320A	Crack Distillate Booster Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	10.00 - 50.00	0.02	36.67	5	0.00000
40-2-P-320B	Crack Distillate Booster Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	10.00 - 50.00	0.02	36.67	5	0.00000
40-2-P-0268	Diesel Rundown Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.4	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
40-2-P-0322	Diesel Rundown Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.4	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
40-2-P-0626A	Diesel Lubricity Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.4	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
40-2-P-0626B	Diesel Lubricity Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.4	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
40-2-P-253	Gas Oil Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	10.00 - 50.00	0.02	36.67	5	0.00000
40-2-P-FUTURE	Gas Oil Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	10.00 - 50.00	0.02	36.67	5	0.00000
40-2-P-321A	Straight Run Booster Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	45.5	0.00	5933.33	5600.00 - 6500.00	0.02	5933.35	5	0.00008
40-2-P-321B	Straight Run Booster Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	45.5	0.00	5933.33	5600.00 - 6500.00	0.02	5933.35	5	0.00008
40-2-P-0260	Diesel Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.4	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
40-2-P-0270	Diesel Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.4	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
NA	Filter Associated with 40-2-TK-0015	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.4	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
40-P-261	Pump Associated with 40-2-TK-16	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.4	0.00	61.67	41.00 - 100.00	0.02	61.67	5	0.00000
40-2-P-258	Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	46.3	0.00	9496.67	92.10 - 9890.00	0.02	9496.69	5	0.00013
40-2-P-266	Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	46.3	0.00	9496.67	92.10 - 9890.00	0.02	9496.69	5	0.00013
40-2-P-290	Crude LSR Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	45.5	0.00	5933.33	5600.00 - 6500.00	0.02	5933.35	5	0.00008
NA	Filter Associated with 40-2-TK-67	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	46.3	0.00	9496.67	92.10 - 9890.00	0.02	9496.69	5	0.00013
40-2-P-259	Pump Associated with 40-2-TK-67	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	46.3	0.00	9496.67	92.10 - 9890.00	0.02	9496.69	5	0.00013
40-2-P-252	Gas Oil Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	10.00 - 50.00	0.02	36.67	5	0.00000
40-2-P-219	Gas Oil Loading Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	10.00 - 50.00	0.02	36.67	5	0.00000
40-2-P-263	Gas Oil Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	10.00 - 50.00	0.02	36.67	5	0.00000
40-2-P-312	Pump Associated with 40-D-F-116	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.5	0.00	36.67	10.00 - 50.00	0.02	36.67	5	0.00000
40-2-P-0146	Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	43.2	0.00	53.25	0.70 - 76.50	0.02	53.25	5	0.00000
40-2-P-0194	Transfer Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.7	0.00	5525.00	5100.00 - 6000.00	0.02	5525.01	5	0.00008
40-2-P-318	Blender Pump	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	53.7	0.00	500.00	5.00 - 500.00	0.02	500.00	5	0.00001
NA	Pump Associated with 40-2-TK-159	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	44.9	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020
40-2-P-142	Gasoline Circulation Pump to Lead Building	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	44.9	0.00	14750.00	8000.00 - 25000.00	0.02	14750.04	5	0.00020

**TABLE A.20.16 STORAGE AND HANDLING PROCESS WASTE STREAMS
FRONTIER REFINING INC., CHEYENNE, WYOMING**

Equipment Number	Equipment Description	Waste Stream Type	Controlled/Uncontrolled	Disposition	Number of Maintenance Events	Percent Aqueous	Percent Organic	Hydrocarbon Density (lbs/ft ³)	Benzene Aqueous (mg/L)	Benzene Organic (mg/kg)	Range of Benzene Concentrations (ppmw)	Annual Waste Quantity (Mg/yr)	Total Benzene in Waste (ppmw)	Volume (gallons)	Total Annual Benzene (Mg/yr)
40-2-P-0064	Pump Associated with 40-2-TK-0084	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.7	7.08	708.00	12.00 - 1200.00	0.02	708.00	5	0.00001
40-2-P-66	Pump Associated with 40-D-F-115	Maintenance/TA	Uncontrolled	Process Sewer	1	0	100	50.7	7.08	708.00	12.00 - 1200.00	0.02	708.00	5	0.00001
NA	Temp. Pump Associated with Spent Caustic Tanks 40-2-V-008/009	Maintenance/TA	Uncontrolled	Process Sewer	1	100	0	58.0	5.01	479.30	0.005 - 2913.25	0.02	5.01	5	0.00000
TAB (Mg/yr)															
0.00301															